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THREE NEW AMPUTATIONS OF THE FOOT, EACH CONSERVING THE CALCANEAL TREAD.

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Conditions of the foot requiring amputation have always presented problems to the mind of the surgeon. The after-result must be one which permits the patient to walk, and he must be able to do so with the maximum of comfort and the minimum of disability. That the problems have been difficult is very evident from the great number of operations which have been invented in the attempt to overcome them, and that the percentage of failures to achieve a satisfactory amount of comfort and functional efficiency is too large is equally evident from the pessimistic attitude of some surgeons of considerable experience, who have confessed a general sense of disappointment by advising that if an amputation cannot be done through the foot at, or distal to, the tarso-metatarsal joint, the best thing for the patient is to amputate not lower than the junction of the lower and middle third of the leg. Then, later on, he can wear a prosthetic appliance fitted with an artificial ankle-joint and foot. This is also well known to be the opinion of a good many makers of artificial limbs, and it must be allowed that these men have opportunities of seeing a large number of amputation results, good, bad, and indifferent, from the practice of many different surgeons.

To accomplish a good functional result after amputation, it is obviously essential that the weight of the body must be by some convenient and comfortable means transmitted to the ground. It must be supported either wholly through the end of the stump, or when that cannot be done, through anatomical features higher up, such as the enlargement presented by the proximal extremity of the tibia and the general conical enlargement of the lower limb from below upwards.

Amputation through the leg at the lower third will, of course, always require an artificial limb for any kind of walking, and the bearing points for weight are adapted to the special circumstances of each case. And whether any of the weight is borne at the end of the stump or not, it is necessary after lower-third amputations to carry the apparatus up round the thigh, and provide it with a metallic hinge-joint at the knee. But, in every case, the comfort of the patient and the functional efficiency of the prosthetic appliance are greatly assisted by the possession of a good, weight-bearing stump, able to rest a portion of its weight on a cushion lying at the bottom of the socket of the apparatus. And this imperatively requires the absence of cicatricial tissue on the bearing point. In these higher amputations no portion of the foot is retained, and so there can be no possibility of any preservation and employment of the calcaneal pad to cover the stump.

The commonest causes of partial or complete amputations of the foot in civil life are cart-wheel and car-wheel injuries, or crushes by the fall of heavy weights, such as iron rails, and the operation is in most cases primary, but sometimes secondary, following traumatic gangrene of the more distal part of the foot. In some countries frost-bite forms another cause, but I have no personal experience in this direction. Burns and scalds, deformities, cicatrices and infections are occasional causes. Military injuries will provide another set of causes.

A number of set amputations are described in the text-books, and very detailed directions are given as to the exact size and shape of the incisions and flaps which have to be cut. These directions are all very well for the dead body, but the practical operating surgeon finds that the cases providing opportunities for the exercise of such formal operations, true to type descriptions, are not common. The days of the spectacular amputation before a crowd of onlookers holding stop-watches in their hands belong to the past; and nowadays it would usually mean atrociously bad surgery. The modern surgeon should know what types of operation produce useful results, and how to make the best use of what material there is. In quite a number of cases the exact shaping of the flaps should be one of the last steps instead of the first, as is the case with the formal text-book operation. It is better to save a superabundance of viable tissue for a potential flap at first, and only cut it down to shape when the time for suturing up approaches, for one can never make a small flap larger after it has once been formed, but redundancy can always be cut down. The surgeon should always make a careful survey of the parts, and he should never use any portion of flap that does not bleed freely when the tourniquet is loosened. It unfortunately happens very often that the skin has been torn free from its subcutaneous attachment to a much further extent than is immediately apparent. To use such material is only to make an experiment in skin grafting that is doomed to failure every time, to the very grave disadvantage of the patient.

Text-Book and Other Operations.

We may now proceed to consider some of the methods of operation which have been devised by various surgeons.

I will say no more about amputations at, or distal to, the tarso-metatarsal joint than that they are said to produce fair to passable results. But, unfortunately, very few cases of foot injury (excluding mere toe cases) are so limited as to make transmetatarsal or tarso-metatarsal amputations possible. Like most surgeons, I have had very little personal experience of them.

Mention may now be made of disarticulation through the medio-tarsal joint, usually known as Chopart's amputation. This is now obsolete as a surgical measure. It has become obsolete, so it seems, not because there were never any good results, but because there were so many bad ones. I will defer a fuller discussion of these to a later stage. Notwithstanding that Chopart's operation is declared to be obsolete and unsurgical, it seems that a knowledge of its technique is still necessary to a student who wishes

to make sure of passing his examinations, and it is therefore taught in some classes of operative surgery. And, as a result, I know the operation is still done sometimes by men who ought to have been better taught.

An operation known as Tripier's was devised to prevent the tilting of the calcaneus apt to follow Chopart's, by providing a flat base to that bone along the tread. In this operation an incision is made, beginning as far back as the Achilles tendon, on the lateral aspect of the foot. The incision is prolonged forward, and at a suitable distance in front, dorsal and plantar flaps are cut. The foot is disarticulated at the medio-tarsal joint, and then the soft tissues, including periosteum, are peeled off the calcaneus from the lateral side towards the medial, and from before backwards, right under the foot and up the medial side until the sustentaculum tali is laid bare. The calcaneus is then seized by lion forceps, and rotated on an antero-posterior horizontal axis, until the medial side is exposed. A horizontal saw cut is then made at a level just below the sustentaculum, beginning on the medial side. The lower portion of the calcaneus is removed, the front of the remaining fragment is trimmed and rounded, and then the flap is brought back under the sawn surface and the parts sutured up. It is obvious that the bony insertion of the Achilles tendon disappears. It is perhaps unnecessary to say that Tripier's operation has never won its way into favour. It is an ingenious conception, but it would be rather a difficult procedure to carry out, and it is very likely also that bad end-results would be the rule.

The next operation to come under notice is what is known as the subastragaloid amputation. This is an excellent operation which I can recommend from my own personal experience. There are several methods of operating. The most generally useful is the heel-flap method, in which a plantar flap is dissected back and the talus removed, somewhat as in the better-known Syme's operation. The flap thus made is then drawn forwards over the head of the talus and sutured to a short anterior flap. In the other methods, the incisions are different, and it is advised that the head of the talus be removed by a horizontal saw cut. In particular cases one form of the operation may be called for more than another. Where possible, I think it is an advantage to preserve the whole of the talus, as it retains a certain amount of ankle movement and gives an elastic spring to the weight-bearing point, modifying the shock of the tread.

Next in order comes a modification of the subastragaloid, known as Hancocks' operation. In this, the posterior end of the calcaneus is sawn through and retained in the heel-flap, as in Pirogoff's amputation. The head of the talus is sawn off horizontally and the calcaneal remnant is then adjusted beneath the remaining part of the talus, in place of the head, with the object of getting bony union and producing a tread formed by the undisturbed covering of the back of the heel. I have never attempted the operation on the cadaver, but I suspect that Hancock's manœuvre would be difficult to accomplish. And I am quite sure that retention of the bony fragment in close apposition would be almost impossible without suturing bone to bone, and therefore bony union would often fail to occur. And, in any case, the back of the heel is quite a doubtful improvement over the head of the talus.

The next amputations to come under notice involve a section through the tibia and fibula a little above the tibio-tarsal joint, the malleoli being sawn off and sacrificed along with the rest of the amputated part. Syme's is the best known and most used operation of this kind. It will be remembered that the posterior flap is obtained from the calcaneal pad and the back of the heel. Syme's amputation is well known to be a good operation, giving, as a rule, a well-protected weight-bearing stump. But it is hardly sufficiently recognized that the after-results are by no means always everything that might be wished. The operation is sometimes attempted in unsuitable cases, or by unskilful hands, or is marred by sepsis, or, at all events, turns out a poor result, the stump being too tender or too badly nourished to permit of weight-bearing. Sometimes it is spoilt by the presence of a cicatrix, and sometimes the pad absorbs, so as to leave a badly protected end.

In the operations known by the names of Roux and Farabœuf, the tibia and fibula are sawn through at the same level as in Syme's, the only differences being in the means of getting a flap. I need not describe them, as the ultimate result is much the same.

There are two more operations described in the books as substitutes for the Syme amputation. The first is Pirogoff's, which may be described as resembling a Syme in which the posterior extremity of the calcaneus is sawn across and retained with the flap. It is then fitted to the sawn surface of the tibia, with the intention of getting bony union. Without wiring, and with an intact Achilles tendon, apposition must tend to be very imperfect, and the vitality of the fragment depends upon a blood supply that is not abundant and is easily interfered with. Experience has shown, at all events, that bony union often fails to occur. Sometimes the fragment gives trouble, but not always. Occasionally it necroses. When successful, the patient walks on what was formerly the back of the heel, and the stump is over an inch longer than Syme's. Pirogoff's is said to give a very good functional result when all goes well. Even then, I should place it as decidedly inferior to the subastragaloid, and hardly an improvement on a Syme. This shows, also, incidentally, my opinion of the relative merits of a subastragaloid and a Syme.

The next substitute for Syme's is Le Fort's, or Pasquier-Le Fort's. In this operation, a long incision is made on the lateral side, whose posterior extremity is a point opposite the Achilles tendon. Forwards, the incision divides and extends round the foot above and below to make a large medial flap, the whole incision thus conforming to the racquet type. The lateral ligaments are divided, the talus seized and removed, the calcaneus is completely dislocated from the lateral aspect, and a saw cut is then made below the level of the sustentaculum tali through the whole length of the bone, by which the proximal half is separated and removed. The malleoli and a slice of the bottom of the tibia are sawn off, as in Syme's operation, and then the upper sawn surface of the calcaneus is fitted to the under surface of the tibia

and the operation is completed. The Achilles tendon is left uncut. This operation leaves the calcaneal pad in its whole length and breadth uninjured for a bearing surface. The stump is, of course, a longer one than that left by a Syme. The operation is said to be a difficult one to carry out satisfactorily, and does not seem to have been very widely practised, but in theory it seems to me to be a better one than either Syme's or Pirogoff's.

There is another operation, usually described as Sedillot's, which is a compromise between Pirogoff's and Le Fort's, but I need not do more than mention it here.

This practically completes the survey of the various operations which have, up to the present time, been devised. I have left some out which are not worth describing separately, in order not to waste time uselessly. It will have been seen that, in all, the most important end-result is to secure a good weight-bearing stump. In some, the calcaneal pad is preserved wholly undisturbed. In others, it is preserved, but as a flap, after being disturbed by dissecting it off its original calcaneal foundation. In a third type, though the calcaneal pad may be more or less preserved for flap purposes, the tissue ultimately bearing the weight is that which covers, or did cover, the back of the heel.

Another result which some operators have sought is to diminish shortening of the limb as much as possible. This, for instance, has been put forward as one of the advantages claimed by Pirogoff's operation over Syme's.

Other results attaching to some operations, and claimed as advantages, have been the preservation of a certain amount of functional ankle-joint action, and also the preservation of the malleoli.

As might have been expected, opinions and points of view as to all these more subsidiary matters have varied. I propose to make a little more reference to them later on.

A New Operation.

Now, although the list of transtarsal amputations is already long, and many methods have been thought out, we have seen that surgeons are not all quite satisfied, and that some are inclined to resort to a lower-third amputation rather than practise any of the existing operations. Therefore, if any new principles or methods which seem to overcome old difficulties can be put forward, no other justification is needed for my boldness in proceeding to describe three new operations which do make such a claim.

Before describing the operations in their developed form, it will be best to say something of the genesis of the first of them.

The occasion which led me to devise the first crude form of this particular amputation was a tramway accident, October 24, 1914, in which a small boy, W.M., nine years old, was run over. One leg had to be amputated at the junction of the middle and lower third. The whole of the foot in front of the talus on the other side was crushed under one of the car wheels, and it seemed to me very important to save as much as possible, seeing what had happened to the companion limb. The mangled mass was cut away with every possible care, to retain viable tissue, and the remnant was surveyed. There was no material for an upper flap at all, and it was seen that there was not enough sole left to cover the surface exposed. I attacked the problem in the following way: With a pair of large bone-shears I made a horizontal section of the talus, and removed the distal fragment. Next, I did a subcutaneous division of the Achilles tendon. Then I cut through the base of the sustentaculum tali, and cleared the soft tissue from the top and sides of the calcaneus. Then the shears were used to make a horizontal section of the calcaneus, the upper convex surface being removed as far back as the blades could reach, and a plane surface left. The residual distal part of the calcaneus was then pushed forwards as far as possible, the front of it, including the greater process, was sheared off, and the remaining fragment was fitted in its advanced position beneath the talus, with a view to getting bony union. No wiring was attempted. In point of fact, the primary intention of all this was to get flap, and this was successfully accomplished. The removal of the anterior portion of the calcaneus gave length to the plantar flap, and the horizontal section of talus and calcaneus, with removal of bone, shortened the vertical measurement, lessening the distance the flap had to reach. The bone cut very easily, and without any tendency to split. The net result of the procedures undertaken was a very satisfactory viable covering for the gap in front, with a well-elevated situation for the cicatrix, away from all risk of pressure.

It is now three years since the operation, and the early promise of a good functional result has been fully borne out. There is a soft, natural, calcaneal tread, ample alike in breadth and length and thickness. There is no tilting of the calcaneus, either vertically or sideways. There is a good ankle-joint, and he can flex and extend in a perfectly natural manner. He walks on the stump with the absolute minimum of jarring, and with perfect comfort. Radiographic examination has shown, however, that the forward position of the calcaneus has not been fully maintained, and that bony union of the fragments has not occurred.

I showed this boy at a meeting of the New South Wales Branch of the British Medical Association in Sydney in 1915, but I have made many unsuccessful attempts to get him to come up to be photographed for illustrating this description. In his case, the temptations that usually succeed in persuading boys have had no effect.

In reflecting on this case, I was deeply impressed by the apparently successful solution of the problem. The technique was, of course, an improvization, but it seemed good enough to test further. It might be improved and developed into an operation that could be usefully employed in some other cases as a preferable alternative to a Syme or a subastragaloid amputation. I resolved to undertake some experiments on the cadaver with this object in view, but before I had had time to do so, I had an opportunity of trying the method, still not fully elaborated, on a second case, this time on a man, R.C.B., 50 years of age, as a secondary amputation. This man's foot had been run over by an electric tram-car. He had refused primary amputation, and waited to see the toes and the covering of the front of his foot become gangrenous and

slough away. He was left with a great blunt cone of denuded, granulating foot sticking out in front. Then he changed his mind about amputation, but, of course, he wished to keep all he could. The skin margin was so far back that flap material would be rather scanty, but long enough to make it just possible that the new technique might be carried out. It did not seem a very promising case, but I resolved to give the residue of his foot a chance, and it certainly had no possible chance, excepting by the method I proposed to try, the only reasonable alternatives being a subastragaloid or a Syme. And if my operation proved unsatisfactory, it would be quite easy to carry out one of these alternatives afterwards.

My procedure in this second case varied in several particulars from the earlier one. I first removed all that portion of the foot anterior to the medio-tarsal joint, leaving the skin intact at the line of demarcation. The head of the talus being thus exposed, a horizontal section of it was done quite easily by an osteotome. At this stage, the Achilles tendon was cut by the usual subcutaneous method. Then the sustentaculum tali was cut off by the osteotome, and removed. The various ligamentous attachments of the calcaneus to the talus were divided, and the osteotome was used to remove the under part of the talus further back. The soft tissues were separated from the upper or proximinal surface of the calcaneus, and the calcaneus was then horizontally bisected by an osteotome entered just above the level of the greater process in front. The section of the calcaneus was carried right back near to the insertion of the tendo Achillis, so that the upper fragment included the smooth surface of bone above the insertion of the tendon. The bone cut easily, but there was some difficulty in getting the back part of the fragment away. Pieces of the surface shell of the posterior extremity of the upper segment were left behind, and no serious trouble was taken to remove them completely when the pieces were not loose, but adherent to soft tissue.

Radiograms taken subsequently have shown that a good deal of bone has regenerated from these fragments.

As a next step in the operation, I removed the greater process of the calcaneus, *i.e.*, the part anterior to the groove which provides attachment for the interosseous ligament. The calcaneus was then pushed forwards as far as it would go, to see how it would fit beneath the talus. It did not come forwards very easily, and required a little freeing, but it was advanced enough for the purpose required. Later experience on the cadaver has shown the technique necessary to get any desired amount of mobilization. The next step was to trim the skin flaps clear of granulation tissue, shape them suitably, and bring them together. Bleeding was not serious, and ligature of vessels was only required at the flap margins; it completely ceased in the deeper parts on the application of hot water. Healing was rapid; the rather deep wound cavity was not infected, or appreciably infected, and the only parts of the flap healing by granulation were the spots where two short tubes had been inserted. The line of cicatrix is a little lower down than one would choose, but it is well above all the weight-bearing area, and out of harm's way. The man has an excellent stump, with ankle action, and he walks on the calcaneal pad only. There is no tilting and no rotation of the calcaneus, or rather, of the united talus and cancaneus, for the radiogram shows bony union. I think one may say that he has all the advantages which might have been hoped for in a successful Chopart, without any of its disadvantages. The man himself is very well satisfied. I am sorry to say that the radiogram has met with misfortune; and, as the man has left his old address and cannot at present be found, illustrations cannot be given. I showed this man at a meeting of the New South Wales Branch of the British Medical Association in Sydney in 1915.

Since the date of the operation just described, I have carried out a very extensive series of experimental operations on the cadaver for the purposes of study. I have tried a large number of imaginable variations in the endeavour to find improvements or eliminate difficulties. In the end, I think I have worked out a technique which is the easiest, the safest, and the most promising of good results. Further than that, during my experiments I developed two other operations which may be more suitable in certain selected cases. These I will distinguish for the purposes of reference as the No. 2 and No. 3 operations. However, just at present, attention will be confined wholly to the No. 1 type. But in regard to any of the operations, I think I have good reason for strongly advising prospective operators to follow as closely as possible the detailed technique that will be described. Of course, the actual necessities of an individual case may compel modifications adapted to the situation. But the rule should be to practise variations first on the cadaver. In my own work, every single specimen of every series has been radiographed in two positions, and the specimen has afterwards been boiled down for examination as a dry bone-preparation. My experience has several times proved that a modification seemingly attractive at its first conception may show up unexpected defects when tested in practice, and such experiments should not be made arbitrarily, at the possible cost of the living. At all events, if the technique that I have gradually developed be followed carefully, and with all its steps strictly according to the sequence laid down, a satisfactory result may be confidently expected, and it will be attained with comparative ease.

The special instruments that will be required, in addition to the stock instruments needed at every operation, are as follows: A sharp osteotome, mallet, gouge forceps, bone shears, sequestrum forceps, lion forceps, rugine, a simple drill of bradawl type, wire guides, silver or bronze wire of thick gauge, so as to have some stiffness. For work on the cadaver I used copper wire of a minimum diameter of 1 millimetre and a maximum of 2 millimetres.

Steps of the Operation.

1. Flaps.—Preserve all viable material, or at least an ample surplus, and trim down later. In a formal operation on the cadaver one may cut flaps like those for a Chopart. The upper flap is cut by an incision starting at a point midway between the tip of the lateral malleolus and the tuberosity of the fifth meta-

tarsal bone and coming across the dorsum of the foot to a point a little behind the prominence of the navicular bone on the medial side of the foot. As the cut crosses the dorsum of the foot it curves forward somewhat, crossing the bases of the metatarsal bones. The plantar flap extends a little further forwards on the sole than the upper flap does on the dorsum. But it is better to have some surplus to cut down than too little to work with.

2. Disarticulate at the medio-tarsal joint, as in Chopart's operation. The head of the talus and the greater process of the calcaneus are now exposed to view. The talus projects about five millimetres further forward than the calcaneus. Clear them somewhat, so as to get a better exposure of the head of the talus.

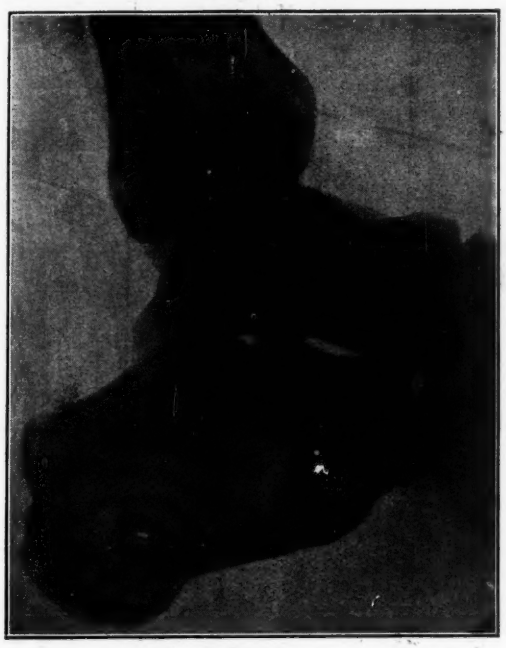


Figure I.

Side view of bones of tarsus in a normal foot. Note the extent of backward projection of the calcaneus (posterior arm of lever), as compared with that remaining after No. 1, No. 2 or No. 3 operation. Note also how, in the normal foot, the forward set of the talus in relation to the calcaneus is such that the head of the talus projects beyond the greater process of the calcaneus. The distance is approximately 0.5 cm. in the male foot. In the No. 1 operation the calcaneus is slid forwards beneath the talus until the extremity of the greater process projects some 2 cm. in front of the head of the talus. In No. 2 and No. 3 it is slid forwards beneath the tibia. The figure shows also the normal slope of the long axis of the calcaneus from behind upwards. The radiogram was taken with the patient lying down and the foot in a position of extension, as is shown by the angle made with the tibia.

3. With the osteotome cut a horizontal sulcus round the head of the talus, at a level about the junction of the upper two-thirds with the lower third of the presenting convex articular surface. The sulcus is deep enough to penetrate the hard crust of the bone as far round as possible. Then deepen the sulcus until the lower third of the head of the talus has been removed. Shave the plane surface underneath the remainder, so as to give the plane a certain amount of slant upwards as the cut runs backwards. The interosseous ligament is now exposed to view.

4. With the osteotome cut through the base of the sustentaculum tali flush with the side of the calcaneus, sever its ligamentous attachments and remove it.

5. The next step makes for ease in subsequent work. With the osteotome cut a horizontal sulcus across the facet on the front of the greater process of the calcaneus which formerly articulated with the cuboid. The sulcus is placed at about a level which marks off the upper third of this surface from the lower two-thirds. Having made the sulcus, cut backwards and upwards from this mark with the osteotome towards

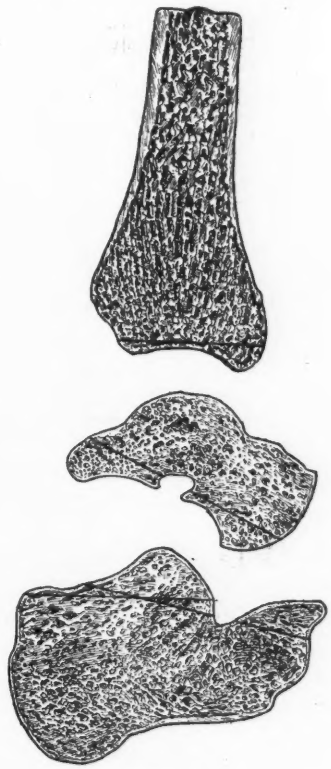


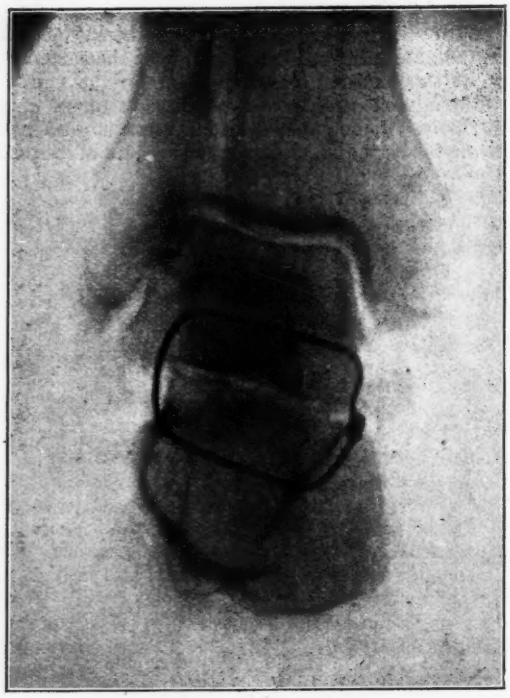
Figure II.

Drawings of sections of tibia, talus and calcaneus. In the lower two bones the front end is to the right, in the tibia the front faces the left. The calcaneus and talus are cut vertically along a plane traversing the long axis of each. That of the tibia is antero-posterior and midway between the malleoli. The illustration shows the bones set at about their normal inclination.

(*a*) *Tibia.*—Note the straight line drawn across the bottom of the bone. This indicates the plane of section made from front to back between the malleoli in No. 2 operation. The plane of section in No. 3 operation cuts off the malleoli also, and lies at a somewhat higher level.

(*b*) *Talus.*—A straight line is shown on the talus, indicating approximately the plane of section recommended in No. 1 operation. Note that the cut begins rather low down on the articular surface of the head, and that the plane slopes upwards and backwards, being interrupted by the groove for the interosseous ligament. The section avoids injuring the ankle-joint or the posterior ligament, but shaves off all the articular surface beneath the bone, with its irregularities.

(*c*) *Calcaneus.*—Note the normal upward and forward inclination of the long axis of the bone. Note the promontory on the greater process, which is removed to give freedom of access to deeper parts of the field of operation. Note the straight lines ruled across the drawing, to show the planes of section employed. One plane, interrupted by the groove of attachment of the interosseous ligament, slopes upwards and backwards from the anterior extremity to a point on the saddle-shaped upper surface, behind the prominent hump indicating the convex articular surface. Another plane slopes from just above the groove to a point at the upper limit of the posterior surface. Note that this plane also slopes upward and backward in relation to the long axis of the calcaneus, but is level with the horizon. This latter slope is that recommended as best for the No. 2 and No. 3 operations, though the former slope is allowable (see Figures XX., XXI. and XXII.). The longer slope (interrupted line) is intended for the No. 1 operation, steepest allowable gradient. A slope cut less steep, and reaching back to the summit of the posterior surface gives the furthest-back limit for the plane that can be recommended (see Figures V., VI. and VII.).



Figures III. and IV.

No. 1 operation: two radiograms from experimental series. It is seen that the plane cut surfaces on the calcaneus and talus, respectively, are brought into apposition and held in place by a wire ligature which is drawn through horizontal drill-holes above and below parallel to the plane of the cut surface. The denser shadow, looking like a "core" in the central part of the talus is produced by the shadow of the head and neck of the bone. It will be seen that the wire passes through this shaded part and not through the lighter peripheral part which belongs to the body of the bone.

the groove just in front of the convex articular facet on the upper aspect of the calcaneus. This is the groove which contains the calcaneal attachment of the

Figure V. and Figure VI.

No. 1 operation. Two side-view radiograms from experimental series. They illustrate the proper plane of section of the talus, and show two examples of planes cutting the calcaneus, one reaching on to the saddle-shaped surface, a little behind the convex articular facet, the other extending as far back as the posterior end of the superior surface. Either of them, or any plane between them, will give a satisfactory result.

interosseous ligament. The cut removes the sharp, upward-curving projection at the anterior extremity of the calcaneus. If left alone, it would be found to hamper freedom of access to deeper portions of the field of operation. (Fig. II.)

6. Cut away the interosseous ligament cleanly from its proximal and distal attachments. Let the assistant grasp the prominent part of the calcaneus with lion forceps and draw it down, away from the talus. Cut the lateral, medial, and posterior talo-calcaneal ligaments, and separate the soft tissues from the upper surface of the calcaneus with a rugine. Then separate the soft parts from the sides of the calcaneus with a rugine, aided, when required, by the knife, and take care also to sever the attachment of the calcaneo-fibular band of the lateral ligament of the ankle to the tubercle on the lateral side of the calcaneus. Never forget to keep all cutting edges directed towards the bone and away from the surrounding soft tissues. Cut short the long flexor tendons of the toes, and that of the hallux, as far back as convenient.

7. Now turn to the talus again. The plane of section already begun through the head and interrupted by the attachment of the interosseous ligament is now carried backwards and a little upwards, until the whole under aspect of the bone presents a flat cut surface, with a slant upwards, so as to shave off the whole of the articular surface. In beginning the cut, make a sulcus as far as possible right round the downward-projecting process that is immediately encountered, and then gradually deepen the cut till the process is severed. This is done to avoid fracture, and to ensure cutting in the right plane. A plane sloping too much upwards will remove too much of the posterior part of the talus. A careless or clumsy operator might cut up into and injure the posterior tibio-tarsal ligament, or he might even enter the ankle-joint. Yet if there is not enough slant, the articular surface will not be completely shaved off posteriorly. It is quite easy to shave off thin parings of bone to produce any slope required, so there is no need to run any risk whatever by massive cuts. Indeed, experience teaches that throughout the whole operation progress attained by small cuts and thin shaving is always the best.

8. We are now ready to return once more to the calcaneus. The removal of the promontory of bone from the greater process has so bevelled it down that, with the removal of the interosseous ligament, it has become possible to apply the osteotome at a slant, so as to shave off successive layers of the convex articular prominence of the calcaneus. Shave away this and the bone immediately beyond till a large plane surface has been produced with a moderate slant up from before backwards. It is here very important to shave, and not to make any attempt to cut massively, a point I have had repeatedly brought home to me in experimental work. If any rash person neglects this advice, he will find that ease of fitting will be replaced by difficulty. The plane of section cuts the bone so that the posterior margin of the section reaches a point on the saddle-shaped superior surface behind the posterior limit on the convex articular facet (Fig. II.). If the plane of section is too horizontal, and the cut surface passes right back on to the smooth area on the posterior surface facing the Achilles tendon, then close approximation of the bones at this situation is less easy to obtain, and there is, moreover, a greater tendency for the soft tissues to crowd in between the opposing cut surfaces. There is also a much greater tendency to splintering of the bone further back, and the increased hardness of the cortical layer tempts to too great violence with the osteotome. But, on the other hand, if the slope of the section is too steep, and if it does not extend far enough back, it offers an impediment to the intended advancement of the calcaneus, and to the fitting of it in the new position. However, it is not a serious matter, and if these two extremes be avoided, quite good results are obtainable over a considerable range between them (Fig. V. and Fig. VI.).

I should say here that it is immaterial whether Step 7 precedes or follows Step 8.

(To be continued.)

APLASTIC ANÆMIA.

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At the meeting of the Australasian Medical Congress in Melbourne in 1908, in the course of a discussion in the Section of Medicine on some forms of anæmia, I referred to two cases which had recently been under my care in the Royal Prince Alfred Hospital, which I considered to belong to that rare form of grave anæmia, first described by Ehrlich and called "aplastic anæmia." Since that time no further cases of this disease came under my notice until a year or two ago, when two other patients suffering from severe and fatal anæmia came under my observation. I propose to record the notes of these cases and then to discuss the subject generally. The notes of these cases are unfortunately very imperfect.

Case I.—S.H.E., a male aged 67, was admitted to the Royal Prince Alfred Hospital under my care in August, 1907. He stated that five weeks before admission he first noticed pains in the thighs and knees which lasted about 14 days. He rapidly became very weak and anæmic. His temperature was raised about two or three degrees above normal, and he died about twelve days after admission. The blood count four days after admission showed the following:—

Red Cells	775,000
Hæmoglobin Value	5%
Colour Index	0.3
Leucocytes	15,500
Neutrophile Cells	17.5%
Small Lymphocytes	42%
Large Lymphocytes	16.5%
Eosinophile Cells	10.3%
Basophile Cells	0.7%
Myelocytes	17.5%

Two normoblasts and no megaloblasts were seen. Another count was made the day before his death, with the following result:—

Red Cells	609,375
Hæmoglobin Value	5%
Colour Index	0.4
Leucocytes	20,000
Neutrophile Cells	16%
Small Lymphocytes	37.5%
Large Lymphocytes	20%
Eosinophile Cells	8%
Myelocytes	10.3%

No nucleated red cells were seen.

The post mortem examination showed the heart muscle flabby, with excess of pericardial fat. The left ventricle was moderately hypertrophied, and the muscle was pale. There was "thrush's breast" appearance on the papillary muscles. The mitral valve was sclerosed along the free margin. The coronary arteries showed a few atheromatous patches. The lungs were healthy. The peritoneum was healthy. The liver was enlarged and fatty and weighed 4 lbs. 5 ozs.. The spleen was enlarged, weighed 2 lbs. 14 ozs. and showed recent perisplenitis. On section the Malpighian bodies were more prominent than usual. The kidneys showed excess of fat round the capsules; the capsules were adherent and the surface granular. On section the cortex was diminished, the pelvic fat increased, the medulla pale and the renal vessels slightly thickened. The stomach and intestines showed numerous submucous petechial hæmorrhages. The bone marrow of the femur was replaced by a firm translucent substance in excess of the normal marrow.

Case II.—J.K. was admitted under my care in August, 1908, in an extremely weak and anæmic condition, with a history of vomiting and diarrhœa, and passing blood *per rectum*. He complained only of pain in the epigastrium. He had no fever, and the urine was normal. A blood count was ordered but not done, as he only lived a day or two after admission to hospital. Post-mortem the heart muscle was seen to be pale and fatty and the valves competent. There were some subepicardial petechiæ. The lungs were collapsed, with free fluid in both pleural cavities and some subpleural hæmorrhages. The peritoneum was normal, the liver was pale and fatty, the spleen was normal and the kidneys were normal. The stomach and intestines were healthy, but showed submucous hæmorrhages. The bone marrow showed exactly the same appearance as in the former case, the marrow having been almost completely transformed into fat.

Case III.—M.L., aged 13 years, a female, was seen in consultation with Dr. E. H. Thane, at Lindfield, in March, 1917. She was first seen by Dr. Thane on March 3, 1917, when she complained only of weakness and tiredness and was very anæmic. The family history revealed nothing of importance. She was born at full time, but was reared with great difficulty owing to constant gastric trouble until the age of two years. When eight and a half years old she had an attack of hæmaturia which persisted for some time. Subsequently it was found to be due to a *Bacillus coli communis* infection and was treated with vaccines. She completely recovered from this trouble and appeared to be in good health at the time of the onset of her last illness, her only ailment being constipation, for which she was given salts from time to time.

Her illness began gradually about January, 1917, with a feeling of weakness and tiredness and it was noticed that she was losing her colour about a month later. The appetite was good, but she was always constipated and had not lost flesh. When seen by Dr. Thane in March, 1917, he noticed that she was an intelligent girl, complaining of no symptoms except weakness and tiredness and shortness of breath on exertion. Her temperature was normal and pulse regular and fairly strong. Her skin was very pallid; the mucous membranes were very anæmic. The heart was beating strongly and the apex beat was in its normal position. Hæmic murmurs were audible at all the cardiac areas and there was a well marked venous hum in the veins of the neck. The lungs were normal. The fauces and mouth were healthy, the teeth good and the breath was natural. The tongue was pale and slightly furred. The bowels were only relieved by aperients. The abdomen was normal; there was no enlargement of the liver, spleen or lymphatic glands. Micturition was normal and the urine never showed any abnormality. Nothing abnormal was discovered in the nervous system. Two days later she vomited for the first time and the anæmia became more marked. Small petechiæ appeared on the buccal mucous membrane and some bruised patches on the legs. After this the breath became offensive. A blood count done at this time showed the following:—

Red Cells	723,700
Hæmoglobin Value	20%
Colour Index	1.3
Leucocytes	3,800
Neutrophile Cells	5%
Lymphocytes	95%

There were no poikilocytes, no nucleated red cells, no eosinophiles and no myelocytes. She rapidly got worse and vomiting became more troublesome, with complete loss of appetite and abdominal pain with offensive motions. She gradually sank and died nine days after the blood count had been taken. No material change occurred in her symptoms. Permission to make an autopsy could not be obtained.

Case IV.—P.McC. *æt.* 24 years, a coal carter, was admitted under my care in the Royal Prince Alfred Hospital on June 3, 1917, complaining of breathlessness and general weakness for the past six weeks.

His family history was good. He was born in this country, but had lived in Sydney for the past 16 years, engaged in ordinary labouring work. He was temperate in drink and smoke and had not had any venereal disease. He had always been healthy, having had no previous illnesses of any kind. Six weeks before admission he began to feel weak at his work and developed headache, giddiness and buzzing in the ears. The headache became more severe but he did not vomit. The bowels were generally very constipated, but he had had an attack of diarrhœa for a week before admission.

On admission he was noticed to be extremely anæmic; his appetite was poor, his teeth were much decayed and there was some *pyorrhœa alveolaris*. The tongue was very pale and furred. There was no pain after food and no vomiting. The abdomen was normal. There was no enlargement of the liver, spleen or glands. He had no pain in the chest and no palpitation of the heart. There was some dilatation of the heart, but no arrhythmia. The lungs were normal. The urine had a specific gravity of 1,014, was faintly acid and contained a very faint cloud of albumin; there was no blood, pus nor sugar. The nervous system was normal. A blood count showed:—

Red Cells	860,000
Hæmoglobin Value	12%
Colour Index	0.7
Leucocytes	3,600
Neutrophile Cells	18.5%
Small Lymphocytes	73%
Large Lymphocytes	5%
Eosinophile Cells	1.5%
Myelocytes	2%

No nucleated red cells and no poikilocytes were seen, but the red cells showed some irregularity in size and shape, with slight polychromasia.

He improved slightly for a couple of days, but then rapidly failed in appetite, and vomiting of dark coloured, offensive fluid set in. His temperature rose to 38.8° C. and remained about 37.8° C.. He became very drowsy. His heart became more dilated and he had constant oozing of blood from the gums. He died just eleven days after admission.

Post-mortem examination showed the blood to be very pale and watery. The fat throughout the body was of a bright yellow colour. The heart was dilated on both sides, the valves, the aorta and coronary arteries were healthy. The cardiac muscle was pale and fatty and showed numerous sub-epicardial and sub-endocardial hæmorrhages. The liver was not enlarged but fatty. The spleen was firm and slightly enlarged. The kidneys were about normal in size, the capsules stripped readily, the surface was smooth, the cortex was not diminished and the pelvic fat was slightly increased. The stomach and intestines presented numerous small submucous hæmorrhages. The brain was very pale; numerous hæmorrhages were scattered over the surface of the cerebellum, and one large one was found over the right temperal lobe. The bone marrow was yellow and very fatty; there were few red cells, but numerous small lymphocytes in the stained film. The lymphatic glands were enlarged in the mesentery and appeared congested on section. Sections of the liver and spleen were stained for the Prussian-blue reaction for free iron, but the results were negative.

As regards the diagnosis of these cases, I think they may be quite legitimately be considered as belonging to the aplastic anæmia group on the ground of the profound anæmia, marked pallor of the skin as opposed to the lemon-yellow tint of pernicious anæmia, the great reduction in the number of the red

cells, the leucopenia with great relative excess of lymphocytes over neutrophile cells and the absence of macrocytes, microcytes, poikilocytes and neucleated red cells. In the first case there was a leucocytosis of 20,000, with slight enlargement of the spleen, which may have been due to a previous syphilitic infection. But the rapid onset of anæmia, with no obvious macroscopic changes in the body, taken with the appearance of the bone marrow and the other features of the blood picture, are sufficiently striking to warrant the assumption that the patient died from profound anæmia of rapid onset, in which there was no sign of any reaction on the part of the bone marrow. In the second case the history and examinations were defective, as the patient died very shortly after admission to hospital and before the importance of the blood examination in this case was appreciated. But the profoundly pallid appearance of the patient, with the absence of any gross changes in the viscera to be detected either during life or after death, the subpleural and submucous hæmorrhages in the stomach and intestines, as well as the appearance of the bone marrow, exactly resembling that in the first case, are points all strongly supporting the diagnosis of aplastic anæmia. Both of these patients, it will be noted, were over 40 years of age.

In the third case, although it was not confirmed by post-mortem examination, the clinical features and the result of the examination of the blood were so striking that there could be no doubt concerning the diagnosis.

In the fourth case we had the benefit of a post-mortem examination in addition to the examination of the blood during life, and here again the evidence all points to the same conclusion. The profound anæmia, the great reduction in the number of the red cells, the low colour index and the high percentage of lymphocytes at once suggested that this was not a case of pernicious anæmia, but belonged to the class of aplastic anæmia. The rapid termination confirmed this opinion.

Pathology.

The statement by Dr. Herbert French in Allbutt's "System of Medicine" that he regards "cases described under this heading as not to be included under pernicious anæmia, but rather to belong to a very grave form of anæmia yet to be named," is perhaps a near approximation to the truth. Nevertheless his brief account of the cases of this disease as being mostly in young subjects, with a preponderance of females, and with a blood picture differing materially from that of pernicious anæmia, particularly in the fact that the colour index is hardly ever greater than 1, while it is sometimes as low as 0.4, is hardly consistent with the descriptions of the disease given by other writers. Owing to this variation in the accounts of cases given by different writers, it is obvious that there yet remains to be evolved a clear and definite account of what cases really fall under this category.

The name "aplastic anæmia" was first given by Ehrlich in 1888, and it was subsequently described by Türck and others, yet our knowledge of the true pathology and pathogenesis of the disease is at present limited. It seems, however, that the general idea prevalent in the minds of those who have published cases of this description, is that along with hæmolysis, such as is present in pernicious anæmia, we have an absence of any reaction on the part of the hæmopoietic viscera to make up for the destruction of blood brought about by the action of some hypothetical toxin. But before we accept this as a working hypothesis, we need to consider the blood picture in detail as well as to correlate this picture with the clinical signs and symptoms of the disease.

The Blood Picture.

(1) *Red Cells.*—The most striking feature about the red cells is the great reduction in the number. Such a reduction must be due either to a great pathological destruction of the red cells by a process of hæmolysis in the portal area, such as appears most probably to take place in pernicious anæmia, or else it must be due to the normal destruction of red cells which occurs in the liver and spleen, but without any new formation of red cells, such as usually takes place in healthy persons, whereby they are kept up at the normal average number. To decide which of these two causes is at work in aplastic anæmia we may first of all consider what evidence there is available of a pathological hæmolysis occurring in the portal area. What are the clinical and pathological signs of hæmolysis occurring in the portal area?

(*i.*) *Clinical.* (*a*) Colouration of the skin.—The characteristic lemon-yellow colour of the skin in pernicious anæmia is supposed to be due to the staining of the skin by the pigments circulating in the blood, which are the result of the destruction of the red cells. The colour of the skin in aplastic anæmia is a deadly white pallor, quite in contrast to the ordinary tint of skin in pernicious anæmia.

(*b*) Urobilinuria.—The presence of pathological urobilin in the urine of pernicious anæmia patients is regarded as evidence of hæmolysis in the portal area. The absence of this pigment from the urine in cases of aplastic anæmia has been emphasized by several writers (Pasteur, Dalton, Weber).

(*ii.*) *Pathological.* (*a*) Clinical examination of the blood.—The blood picture in pernicious anæmia is characterized by the presence of normoblasts, megaloblasts and a great variation in the shape and size of the non-nucleated red corpuscles, poikilocytes, polychromatophilia, granular basophilia and an increased colour index. This picture is considered to be due to the action of some toxin in the blood, inasmuch as the same picture can be produced experimentally in animals by the introduction of such poisons into the blood, as toluylenediamine, ricin, saponin, pyridine and pyrogallol. This picture is, however, a complex one, for some of its features undoubtedly point to a compensatory action on the part of the bone marrow, while others suggest the destruction of the red cells. Of the latter poikilocytosis is probably the most important. There is little doubt that the poikilocytes are deformed, misshapen erythrocytes, usually of somewhat smaller size than that of the ordinary erythrocytes, but there is some doubt as to the cause of this change in the erythrocytes. Ehrlich appears to have regarded them as being the result of fragmentation of the megaloblasts and suggested that they are produced as part of a regenerative process to afford a larger carrying surface of hæmoglobin to compensate for the destruction of the erythrocytes in the circulat-

ing blood. Professor Welsh, however, tells me that poikilocytes are not found as such in the marrow tissue, though they may be found in the blood and in the blood vessels in the marrow. Pappenheim, in speaking of macrocytes and microcytes, says that they are not a sign of a megaloblastic regeneration on the part of the hæmopoietic tissue, but are signs of degeneration found equally in pernicious anæmia and in simple anæmias. Poikilocytosis points to a degenerative action by the blood plasma upon erythrocytes whose osmotic resistance has been weakened. Da Costa also seems to regard poikilocytosis as due to some alteration in the blood plasma, an alteration in its isotonicity leading to distortion of the erythrocytes. The balance of evidence, therefore, would seem to indicate that poikilocytosis is the result of some alteration in the blood plasma affecting the physical condition of the tissue structure of the erythrocytes. Such alteration in the blood plasma may be due to the presence of a toxin produced in the body, or to the introduction of some chemical substance from without. Poikilocytosis may then be regarded as an evidence of hæmolysis.

(*b*) The second pathological fact given as evidence of hæmolysis is the deposition of hæmosiderin in the tissue of the liver, spleen and kidney. This substance is said to be due to the destruction of the erythrocytes in the portal system with separation of the pigments and deposition of free iron in the tissues of the organs named.

Taking these two points in relation with the pathological conditions found in aplastic anæmia, it is noteworthy that all those who have investigated the blood picture presented by cases of aplastic anæmia, agree in emphasizing the fact that the red corpuscles in this condition show practically no abnormalities; the absence of poikilocytosis is specially noted. So that in this respect the blood picture of aplastic anæmia is in marked contrast with that of pernicious anæmia, a disease in which there is a good deal of evidence to prove that active hæmolysis in the portal area is a characteristic feature of the disease.

As regards the deposition of free iron in the tissues of the liver, spleen and kidney, the evidence is not so conclusive. For in some cases it is stated that such a deposit of free iron was found in those situations, while in others it is distinctly stated that there was no such deposit.

We see then that the only conclusive evidence of a pathological destruction of red cells in the portal area occurring in cases of aplastic anæmia is the deposition of free iron in the liver, spleen and kidney in some of the cases only, so that we may say that the evidence of hæmolysis being an essential feature in all cases of aplastic anæmia is wanting. We are consequently driven to the second possibility, namely, that the reduction in the number of the erythrocytes is the result of the normal process of blood cell disintegration in the spleen and liver, and that the loss is not compensated by any new formation of red cells in the bone marrow. This is further supported by the absence of any nucleated red cells. So far as I am aware there is no evidence to show to what extent the destruction of effete red cells occurs in normal individuals and, therefore, we cannot say how far the normal process of cell disintegration can account for the great reduction in the number of erythrocytes in these cases. But if the proof of hæmolysis in the portal area is wanting in cases of aplastic anæmia, then the theory that the destruction of the red cells is brought about by some toxin circulating in the blood is not proven.

(2) *The Colour Index.*—French states that the colour index in aplastic anæmia is hardly ever greater than 1 and is sometimes as low as 0.4. Türck's cases, on the contrary, almost always showed a high index and this seems to be the experience of several others who have published cases of this disease. Panton speaks of a high colour index as one of the characteristic features of the disease, and Turnbull also refers to the high colour index in three of the cases of aplastic anæmia met with in munition workers. In my own patients the first had a colour index of 0.3 and 0.4. In the third case it was 0.7 and in the fourth case it was 1.3. These figures are so variable that no hard and fast line can be laid down as to the colour index, but it is certainly striking that Türck and Panton are so emphatic that a high colour index is the rule.

(3) Another characteristic feature of the red cells in pernicious and other severe forms of anæmia is the presence of polychromatophilia and punctate basophilia. The exact interpretation of these features in the red cells is open to question. Some urge that they are evidence of degeneration in the erythrocytes; others believe them to be indications of immaturity in the red cells. Now in the blood picture of aplastic anæmia we find that these signs are generally absent. In fact it is expressly stated by Panton that the morphological changes in the red cells are extremely slight and, with the exception of occasional macrocytes, the red cells might be passed as normal; in many of the cases recorded it is distinctly stated that there was no polychromatophilia nor punctate basophilia, or if present, they were extremely slight. If then these signs in the red cells are to be taken as evidence of a change of a degenerative nature, their absence in cases of aplastic anæmia must be taken to indicate an absence of any toxin circulating in the blood having any direct action on the red cells. On the other hand, if they are to be regarded as signs of immature red cells, suggesting an attempt on the part of the bone marrow to compensate for blood destruction, then their absence in aplastic anæmia is to be taken as evidence of there being no compensatory activity on the part of the bone marrow.

(4) *Leucocytes.*—All authorities are agreed that a characteristic feature in the blood picture is the occurrence of what is called a relative lymphocytosis and a neutrophile leucopenia, the total leucocyte count being as low as 1,200 per cubic millimetre or less. In other words, there is a relative destruction or failure of production of the neutrophile cells, while the lymphocytes remain at practically the normal level or slightly below it. The neutrophile polymorphs are derived from the bone marrow and their great diminution confirms the view that in this disease the bone marrow has ceased to functionate. The expression relative lymphocytosis is hardly accurate, for there is no true lymphocytosis at all, as the total number of lymphocytes may be less than that found in normal blood.

The evidence, then, so far as we have it, points to a profound loss of erythrocytes and of neutrophile leucocytes, due not to the action of any toxin circulating in the portal area, but to the ordinary processes of red cell disintegration, with a failure of the function of the hæmopoietic viscera to compensate for this loss. The evidence so far available is, therefore, not in favour of an hæmolysis in the portal area, at all event, in every case of aplastic anæmia, in spite of the fact that Türck emphatically calls it "hæmolytic aplastic anæmia."

We have also seen that the absence of poikilocytosis, polychromatophilia and punctate basophilia may be taken as evidence of a normal condition of the erythrocytes and of the absence of any change in the physical or chemical condition of the blood plasma.

In considering the cases which have been described as aplastic anæmia, I think we can recognize two classes, but it is doubtful how far these can be considered as two distinct diseases. It is well to bear in mind that in practice we find many ill-defined transitional cases of disease of the various systems or groups of organs which we cannot assign to any definite place in our nosology, and in no group of diseases is this statement more applicable than in that of the anæmias.

(1) It is a striking fact that a number of the cases are met with in young persons of both sexes, for which it is difficult to assign any particular cause. In my own two cases, one in a girl of thirteen years and the other in a youth of twenty-four years, there was absolutely nothing in the past history of the patients to throw any light on the development of a grave and fatal anæmia. It is true that in some cases, for example, Weber's case, some suppurative condition about the mouth had occurred, but this had cleared up and yet the grave anæmia persisted till death in a few weeks. In these cases in young persons the progress of the disease is fairly rapid, in my cases two months and three weeks respectively, in Pasteur's case seven weeks, and in Weber's case ten weeks. A case has, however, been recently reported by Parkinson of a grave anæmia developing in a boy which presented the characteristic features of aplastic anæmia, in whom after the lapse of some months apparently complete recovery took place. It is at least highly suggestive that in cases of this disease occurring in young persons, the bone marrow is congenitally defective in some way or other and that it prematurely fails to sustain its function of blood formation. Such a condition might be compared to the premature atrophy of muscle and nerve fibres in some cases of nervous disease which Sir William Gowers spoke of as a process of abiotrophy. In the case of a tissue so vitally necessary to the maintenance of life as the blood, it is evident that any congenital weakness or loss of power of endurance in the bone marrow would rapidly lead to a fatal termination and there would be, moreover, no evidence to indicate the existence of such a congenital defect.

The second class of case is met with in older persons and in others in whom there appears to be a definite cause at work capable of paralysing the activity of the bone marrow. In the cases of aplastic anæmia which have been met with in munition workers, it is suggested that the anæmia is caused by a poison acting upon the cells of the blood-forming organs and also upon the circulating erythrocytes; Turnbull expresses the opinion that trinitrotoluene or some chemical associated therewith is this destructive agent. This may be so, but we must take into consideration the fact that out of the large number of patients who developed symptoms of poisoning by trinitrotoluene, such as toxic jaundice, etc., only a very small percentage showed the blood picture of aplastic anæmia, and it is conceivable that in these cases the bone marrow may have been in a condition of potential failure of function previous to the action of the chemical poison.

It is stated by some writers that aplastic anæmia follows upon tuberculosis, syphilis, influenza and other infective diseases, malignant disease, malaria, etc., but on what evidence this statement is based is not quite clear. It is, however, conceivable that, as in these diseases we have the presence of microbic or other toxins, the bone marrow may be paralysed by their action and so the phenomena of aplastic anæmia may appear. I am not aware that any researches have been published correlating the blood picture during life with the condition of the bone marrow after death in cases of severe anæmia following upon the above-mentioned diseases.

This second class of cases occurs more frequently in older persons, and would appear to be a terminal condition following upon some infection, either acute or chronic, in which the ordinary process of red cell disintegration goes on, but owing to the exhaustion of the bone marrow no new formation of red cells takes place.

It is worthy of note that a similar condition of exhaustion of the bone marrow, leading to a blood picture resembling that of aplastic anæmia, is met with as the terminal state in cases of pernicious and other forms of grave anæmia. In these cases the bone marrow is able for a time partly to compensate the abnormal destruction of blood cells, but sooner or later it becomes exhausted, either as a result of the excessive drain npon its resources, or is paralysed by the direct action of the supposed toxin upon it.

To sum up then, I would suggest that aplastic anæmia in young persons is the result of the exhaustion of function of a bone marrow congenitally defective in power of endurance, while in older persons it is the result of some poison or poisons which, acting on the bone marrow, destroys its function and so leads to the death of the patient. A pathological hæmolysis as an essential part of this syndrome is not proven.

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Reviews.

MEDICAL JURISPRUDENCE.

The triad, medical ethics, forensic medicine and toxicology, forms a frequently neglected chapter in the education of the medical student. By common accord the leading authority in matters concerning the first division of the trial in the British Empire is the late Robert Saundby. Among the most expert of the medical jurists is Professor John Glaister. His text-book on medical jurisprudence and toxicology is consequently a classic and at all events as far as the former subject is concerned will hold its position as the book to be consulted for many years.[1] It would be superfluous to give in this place an exhaustive summary of the contents of the book, since it covers the whole subject of medical jurisprudence. In the introductory chapter the author defines his subjects and passes to an excellent review of the functions, constitution and powers of the General Medical Council. He then proceeds to a consideration of legal criminal procedure and adds a half a dozen pages on workmen's compensation. In view of the fact that the Australian acts are based on the English *Act*, a great deal of this is applicable to Australia. We have nothing but praise for the manner in which he presents his forensic matter. The questions of medical evidence, professional secrecy and privilege, of death certification, of the many causes of sudden, violent and accidental death, of identification of the living and of the dead, of blood stains, etc., of the medico-legal relation to sexual function, of rape, of lunacy law and of inebriety are discussed temperately and concisely. Since the author is a Professor at the University of Glasgow, the greater number of his illustrative cases are cited from the Scottish Courts, but he is ever at pains to explain when practice or the law differs from that south of the Tweed. It needs but little additional legal knowledge to apply his teaching to Australian conditions.

The second part of the book is reserved for toxicology. This part occupies 223 pages and herin lies its chief defect. Toxicology is a subject that is extremely difficult to teach, since opportunity to observe cases of poisoning, even with the commoner agents, offers itself at relatively long intervals. In the laboratory a considerable amount of knowledge can be accumulated, but this form of instruction is slow and cannot be extended sufficiently to enable the average student to master the subject. Consequently the student must be satisfied with a more or less general conception of the subject and the practitioner must refer to a text-book when an unusual form of poisoning requires his attention. Professor Glaister's lessons are too full for the student, but scarcely full enough as a book of reference. He has inserted into the pages at his disposal a wealth of fact, and has certainly achieved wonders within these limitations. A standard, complete text-book on toxicology, as far as we are aware, does not exist in the English language. The author has followed the usual procedure in appending toxicology to forensic medicine. We regard this as a fault. But the information contained in this part of the book is reliable and well set out. Medical students and medical practitioners will be well advised to procure a copy of this book for frequent reference.

[1] A Text-Book of Medical Jurisprudence and Toxicology, by John Glaister, M.D., D.P.H., F.R.S.E., Third Edition; 1915. Edinburgh: E. & S. Livingstone, Demy 8vo., pp. 857, with 137 illustrations and one coloured plate. Price, 14s.

Public Health.

VICTORIA.

The following notifications have been received by the Department of Public Health, Victoria, during the month of May, 1919:—

	Metropolitan. Cs.	Dths.	Rest of State. Cs.	Dths.	Total Cs.	Dths.
Enteric Fever	5	2	19	0	24	2
Scarlatina	65	3	65	0	130	3
Diphtheria	186	7	158	5	344	12
Pulmonary Tuberculosis	83	29	28	16	111	45
Puerperal Fever	3	0	4	0	7	0

Influenza.

The returns of cases of influenza notified to the Department of Public Health are as follows:—

	Metropolitan. Cases.	Rest of State. Cases.	Totals. Cases.
For week ending May 18	123	70	193
For week ending May 25	67	54	121
For week ending June 1	73	42	115

SOUTH AUSTRALIA.

The following notifications have been received by the Central Board of Health, Adelaide, during the four weeks ending April 26, 1919:—

	Adelaide. Cs.	Dths.	Rest of State. Cs.	Dths.	Total. Cs.	Dths.
Enteric Fever	2	1	18	1	20	2
Scarlatina	9	0	121	0	130	0
Diphtheria	15	4	170	4	185	8
Pulmonary Tuberculosis	5	10	39	18	44	28
Erysipelas	1	0	3	0	4	0
Morbilli	3	0	39	0	42	0
Pertussis	1	0	33	3	34	3
Influenza	108	9	764	27	872	36
Cerebro-Spl. Meningitis	0	1	0	0	0	1

TASMANIA

The following notifications have been received by the Department of Public Health, Tasmania during the month of April, 1919:—

Diseases.	Hobart. Cases.	Launceston. Cases.	Country. Cases.	Whole State. Cases.
Enteric Fever	5	4	14	23
Diphtheria	7	30	64	91
Pulmonary Tuberculosis	2	1	3	5
Scarlatina	0	1	2	3
Bilharziosis	1	0	0	1

WESTERN AUSTRALIA.

The following notifications have been received by the Department of Public Health, Western Australia, during the month of April, 1919:—

	Metropolitan. Cases.	Rest of State. Cases.	Totals. Cases.
Enteric Fever	26	21	47
Scarlatina	55	36	91
Diphtheria	66	47	113
Pulmonary Tuberculosis	21	13	34
Puerperal Fever	0	4	4
Malaria	85	0	85
Beri-beri	0	6	6
Dengue Fever	0	20	20
Ophthalmia neonatorum	1	2	3

Dr. J. B. McLean has been lent by the Home Secretary's Department to the Metropolitan Joint Health Board, in order that he may take up the position of Medical Superintendent of the Exhibition Isolation Hospital, Bowen Park, Brisbane. Arrangements have been made for Dr. L. W. Gall to act as Medical Superintendent of the Brisbane General Hospital, while Dr. McLean is on duty at the Exhibition Isolation Hospital.

The Medical Journal of Australia.

SATURDAY, MARCH 14, 1919.

The Medical Student and his Teacher.

Progress cannot be achieved without revolution, be it gradual or sudden. There are signs of drastic changes being wrought in many sections of society at the present time and men are prepared to face upheavals which would have caused dismay but a few years ago. The medical profession and the public are are gradually being led to recognize the necessity for fundamental changes in the practice of hygiene and medicine. It needs no prophet to forecast an early realization of these changes. In the near future the methods adopted to prepare young men and women for admission into the medical profession will be completely revised and remodelled. The members of the medical profession will be compelled to recognize a new order of things in regard to their relations to the public. The general practitioner will have to accept a clearly defined responsibility regarding the preservation of the public health, and in the practice of curative medicine working in teams will be demanded by the patients. These innovations cannot be introduced with any prospect of success unless and until the medical student is trained in accordance with a new plan, a plan that will ensure for him a satisfactory equipment in preventive as well as curative medicine.

The medical student of to-morrow must be an active participator in this revolution as well as the teacher. He must lend himself to a large undertaking and be prepared to raise his future profession to a high level. His training will be directed in such a manner that the attainment of scientific knowledge will be the primary consideration. The preparation for and passing of examinations will be merely incidents in his life's work and he must recognize this at the outset. He must be taught to prize knowledge more highly than the earning of high fees and he will have to learn the lesson that, even if he is eminently successful, his achievements and his knowledge will be but poor things. His life will have to be spent in an endless endeavour to add to our meagre stock in trade.

All this applies equally to the teacher. After all the student of one generation in the medical school is the teacher of the next. The teacher will not fulfil his mission if he contents himself to instil into his pupils' minds a minimum amount of crammed knowledge that will suffice for examination purposes. His aim must be to educate hygienists and physicians, men and women whose lives will be spent for the benefit of the community. He will have the duty to dissuade the unsuited from completing their studies, for a medical school loses in efficiency when its students are of the wrong calibre. The teacher whose students are not taught to think originally, to learn technique in the laboratory and in the ward and to acquire knowledge and skill that will awaken a thirst for more, should not be allowed to mould the destinies of future medical practitioners. The coming revolution in medicine must be based on an improved system of teaching and on an improved system of learning.

SHOCK.

The subject of shock has attracted the attention of surgeons and physiologists for very many years, but until the extended experience on the field during the war stimulated many investigators to renewed efforts, small advance in our knowledge of this condition has been made for close on half a century. Goltz demonstrated in 1870 that an acute dilatation of the arteries in the splanchnic area could be induced by applying a sudden and powerful stimulus to the sympathetic nerves in the mesentery. The animal could be bled to death by hæmorrhage into its splanchnic arteries by a direct blow on its exposed mesentery. The observation that shock or collapse followed loss of blood by hæmorrhage was regarded as confirmatory evidence of the conception that shock was due to the withdrawal of blood from the circulation. Acting on this assumption surgeons employed the injection of saline fluid either under the skin or into a vein to remove the essential cause of the condition. Unfortunately the uselessness of this measure was not fully appreciated and the cause of its failure was consequently undreamed of. During the course of the war it has been found that shock is a far more com-

plex phenomenon than the experiments of Goltz indicated, although his observations have been confirmed and extended. The military surgeon was compelled to deal with shock in a practical manner and his treatment was to a considerable extent empirical. The material was so plentiful and the opportunity for blind experimentation so boundless that a certain accumulation of information accrued as a result of practice. Spurred by the clamant necessity for a better understanding of the phenomena and for a sounder scheme of treatment, physiologists again attacked the problem and little by little many of the hidden elements have been revealed. In August, 1917, the Medical Research Committee in Great Britain invited eleven prominent laboratory and clinical investigators to form a committee of enquiry for the purpose of coordinating the work that had been carried out in connexion with this problem and of giving a lead to other workers throughout the world concerning the points that still required elucidation. This committee has now issued a valuable report. A résumé of the contributory chapters of this report will be published in this *Journal* in an early issue. Our object is to call attention to the present state of our knowledge of surgical shock and its allied conditions, in order that Australian scientists may make observations and contribute to the unravelling of those skeins which are still tangled.

The physiological basis of shock has been stated by Goltz. War experience has traced the essential dilatation of so-called primary shock to hæmorrhage, pain, cold, mental distress and rough handling. How the stimulus of these factors is translated into a nervous impulse is unknown. No gross changes nor chemical alterations have been discovered to throw any light on the nature of the causal mechanism. In the next place, the condition spoken of as secondary shock appears to be of a different nature. It is likened to a faint or collapse and its onset may be delayed for a considerable period. It is assumed that this secondary shock is of a toxic origin. It is known that gross injury to muscle can produce a state of shock. Physiologists are endeavouring to ascertain whether an injured muscle can elaborate a toxin capable of inducing the symptoms of shock. A short time ago a theory was pressed forward that shock was a form of acidosis, but this theory is no longer regarded as tenable. The fact that chloroform and ether when inhaled to induce anæsthesia are endowed with the power of reviving symptoms of shock, may be regarded as evidence supporting the assumption that secondary shock is a toxic condition. It is a significant fact that in the condition both of primary and of secondary shock fluid introduced into the blood vessels tends to pass out with great rapidity. Some observers attach importance to the fact that while the infusion of saline fluid into the blood vessels is of no therapeutic value, clinically good results follow the introduction of either blood or gum solution. It appears to be dangerous to argue from final causes of this kind, especially since it is by no means certain how these procedures act in combating the dilatation of the peripheral capillaries. One further fact of great importance has been brought out. It is that in the majority of cases secondary shock depends usually on one or more causal factors in addition to the hypothetical toxin.

THE ACTION OF MUSTARD GAS.

Mustard gas is the vapour produced by the spontaneous evaporation of dichlorethyl sulphite, an oily colourless liquid first prepared by Victor Meyer in 1886. This oil gives off vapour with a characteristic odour suggestive of mustard or of garlic. Its poisonous action on the respiratory tract, skin and eyes was noticed by its discoverer. Numerous observations and investigations on the local effects of contact with mucous membranes have shown that mustard gas causes conjunctivitis and superficial necroses of the cornea, hyperæmia, œdema and finally necroses of the the skin, giving rise to chronic ulcer which heals slowly, and congestion and necrosis of the epithelial wall of the trachea and bronchi. These effects led to the use of mustard gas in warfare. The condition of the trachea and lungs of some of those exposed to the influence of the gas has suggested that this gas produces poisoning as a result of its absorption.

An extensive investigation[1] of the action of dichlorethyl sulphide has been carried out by Vernon Lynch, H. W. Smith and E. K. Marshall, Jr., of the Pharmacological Research Section of the Medical Division of the Chemical Warfare Service of the United States Army. These investigators have found that dogs exposed to the vapour of dichlorethyl sulphide exhibit symptoms, such as vomiting, diarrhœa, convulsions and circulatory disturbance, which suggest absorption into the blood stream and systemic action. They have injected solutions of the drug in olive oil into dogs and have found that quantities of 14 mg. per kilo. of body weight lead to a fatal result. The symptoms have been similar to those seen in dogs exposed to the vapour. The symptoms appear about ninety minutes after subcutaneous or intramuscular injec-

[1] *Journ. Pharm. and Exper. Therapeutics*, November, 1918.

tion. Death follows in six to seventy hours according to the dose.

Dichlorethyl sulphide is only slightly soluble in water. Aqueous solutions undergo hydrolysis, the dichlorethyl sulphide being converted into hydrochloric acid and dihydroxyethyl sulphide. This hydrolysis varies in speed with the temperature, so that only 15% of the sulphide is decomposed at 10° C. in ten minutes, while over 90% is composed in the same time at 37° C.. Cold aqueous solutions have been injected intravenously into dogs and have produced the typical symptoms of salivation, diarrhœa, convulsions and heart failure. The symptoms do not develope until some minutes after the injection. If, however, the aqueous solutions are allowed to come to the temperature of the room or have been kept for some hours at 8° C., no symptoms are produced by their injection into the veins of dogs. Such aqueous solutions have also lost the power of irritating the skin and the eyes. The urine of dogs which have been poisoned with mustard gas, contains dihydroxyethyl sulphide. The injection of solutions of dihydroxyethyl sulphide into dogs does not lead to any symptoms of poisoning even in such large doses as 0.3 gm. per kilo. of body weight. This body does not produce any burning of the human skin nor does it cause inflammation of the eyes.

The latent period in the development of the effects of dichlorethyl sulphide, either locally upon the eyes, skin or respiratory passages and after absorption, suggests that this substance undergoes alteration in the body before giving rise to its characteristic action. The simplest change that this body can experience is its conversion into hydrochloric acid and dihydroxyethyl sulphide. The latter compound is without the characteristic action of mustard gas. Hydrochloric acid can be introduced into the veins in much greater quantities than is produced by the decomposition of mustard gas without producing any symptoms of poisoning. Both the products of the hydrolysis of mustard gas are very soluble in water and only sparingly soluble in organic solvents. They will thus have a low lipoid solubility or partition co-efficient. It would therefore be expected that they would not readily penetrate into the cells of the tissues. Mustard gas, on the other hand, is very slightly soluble in water and very freely soluble in organic solvent. It has, therefore, a high lipoid solubility or partition co-efficient. It will, therefore, penetrate very readily into the cells of the tissues. Its rapid powers of penetration are demonstrated by its well-known action upon the skin. After its penetration into the living cell it will undoubtedly undergo hydrolysis. It has been suggested by Lynch, Smith and Marshall that the liberation of free hydrochloric acid within the cell will produce the actions of dichlorethyl sulphide. The mechanism of the action of mustard gas will thus consist of rapid penetration of the substance into the cell by virtue of its high lipoid solubility, of the decomposition of the mustard gas by the water within the cell to form hydrochloric acid and of the destructive effect of hydrochloric acid upon some portion of the cell.

Some suggestive experiments have been carried out upon fish placed in water at different temperatures. If the temperature of the water is lowered so that mustard gas does not undergo rapid decomposition, goldfish and catfish which have been exposed to water containing dichlorethyl sulphide, do not show any signs of poisoning. If similarly exposed fish are placed in water at room temperature they exhibit symptoms of poisoning and die. In the light of these investigations it is suggested that some substance, such as an amine, of high lipoid solubility which will slowly yield alkali on hydrolysis, should be sought. This body should be tested as an antidote in poisoning by mustard gas. The direct introduction of solutions of carbonate of soda into the circulation has no effect in warding off the symptoms of poisoning by mustard gas. This alkali, however, does not penetrate into the cells.

WAR PENSIONS.

The Federal Treasurer in his annual statement of the pensions claimed by and paid to incapacitated soldiers and to the dependants of incapacitated and deceased soldiers, gives some significant information. During the twelve months from July 1, 1917, to June 30, 1918, 83,346 pensions were claimed. In addition there were 1,759 claims under consideration at the beginning of the period. No less than 11,163 claims were disallowed. After making deductions for transfers and deaths, and allowing for other adjustments, the number of war pensions current on June 30, 1918, was 110,174. This number is 64,983 more than the number of pensions current on June 30, 1917. The number of pensions granted to dependants of deceased members of the Australian Imperial Force and other military or naval forces of the Commonwealth was 37,318. The mothers of deceased soldiers and sailors receiving pensions numbered 15,616, their children 11,195 and their widows 6,822. Pensions were paid to 40,702 incapacitated members of the forces and to 32,154 of their dependants. The average fortnightly rate of pension was £1 16s. 5.1d. in the case of the incapacitated members themselves and £1 1s. 3.32d. in the case of dependants. The average rate varied according to the State in which it was paid. The total expenditure on war pensions amounted to £2,772,077 during the twelve months. The cost of administration was £61,146, a sum equivalent to just over 2% of the sum expended. The chief items are:—

Commission to the Postmaster-General's Department	£16,151
Temporary Assistance	15,817
Salaries	12,104
Medical Examinations	6,531
Stationery and Printing	3,001
Incidental Expenditure	2,172
Postages and Telegrams	1,839
Rent	1,438

There seems to be some disproportion between the amount paid to the medical profession for work performed and the amount paid to the Postmaster-General's Department in addition to postages and telegrams. The latter payment is at the rate of 12s. 6d. for every £100 paid as pension.

We regret to record the death of Dr. Charles William MacCarthy, which took place on June 7, 1919, at his residence in Sydney.

Abstracts from Current Medical Literature.

PATHOLOGY.

(208) Temperature of Inflamed Areas.

Mario Segale has attempted to determine whether the heightened temperature of acutely inflamed tissue is due to increased oxidation of the part or to hyperæmia (*Journ. Exper. Medicine*, March, 1919). The rise in the local temperature in peripheral regions of the body, which are the seats of inflammation, is generally attributed to increased flow of blood through the tissues. It is usually stated that the temperature of the inflamed part is not higher than the temperature of the internal organs and that the temperature is proportional to the degree of the inflammatory hyperæmia. Many attempts have been made to measure the temperature of the arterial blood entering the inflamed region and the temperature of the venous blood leaving the part. These attempts have not been successful, owing to the difficulty of maintaining the circulation without impairment when the thermometers are in position in the artery and vein. The author has adopted a different experimental method. By electrical means he has compared the temperature of an inflamed area in the leg of a guinea-pig with that of the same region in the opposite leg. The animal has been killed, so that the circulation ceases or a temporary ischæmia has been established by compression of the aorta. The differences in temperature on the two sides of the body have been followed under these conditions. The registration of temperature has been made by comparing the electro-motive force developed in metallic junctions placed in the tissues. The metals that have been used have been patent nickel and iron. This couple produces a potential of 45 microvolts for each degree of difference between 0° C. and 100° C.. By the aid of a Thompson galvanometer and suitable resistances exact readings have been obtained for 0.1° C.. To avoid radiation a suitable room was employed which had been built for calorimetric investigations. The readings of the instruments have been made in an adjoining room. The inflammatory lesion has been produced by fracturing the femur some days previously. When the guinea-pig has been killed by puncture of the medulla the difference in temperature in the two legs has increased from 0.9° C. to 3.2° C. in the course of an hour. The difference has then lessened until the two legs show the same temperature after six hours. As this difference might be attributed to more rapid cooling in the healthy limb, the experiment has been repeated in the room warmed to 36° C., to diminish external radiation. The temperature of the inflamed region has risen 1.5° C. after the cessation of the circulation. When the circulation has been temporarily suspended by compressing the aorta, the difference in temperature has increased by 2.5° C.. After the administration of a large dose of chloral, which diminishes oxidation, the temperature of the two sides remains the same after compression of the aorta. It thus appears that the hyperæmia tends to lessen the temperature of inflamed tissues.

(209) Organisms Causing Cystitis.

Shuichi Niwa has separated an organism of the colon group from a patient suffering from cystitis and has subjected it to an exhaustive examination (*Journ. Med. Research*, March, 1919). Since Pasteur ascribed ammoniacal urinary disorders to the presence of bacteria it has been acknowledged that these organisms excite cystitis, except in a few instances, caused by chemical substances and animal parasites. During the last twenty-five years some bacteriologists have sought to prove that cystitis is due to the microbes capable of decomposing urea, while others have asserted that the *Bacillus coli communis* is the most frequent cause of cystitis. The latter view has prevailed, though it is recognized that many organisms, regarded clinically as "*coli*," do not belong to the colon group. The author separated a bacillus on four occasions from the urine of an elderly man suffering from chronic cystitis. The organism was present in pure culture. On examination it was found to be a rod-shaped bacillus with rounded ends. It was not motile and did not form spores. It was not acid fast and did not retain Gram's stain. In the urine, but not in culture, it formed chains. It grew easily at 37° C., as well as at room temperature. It did not liquefy gelatine and behaved in stab culture as a facultative anaerobe. It produced permanent acidity in litmus milk in one day at 37° C. and a clotting in two days at the same temperature. The indol reaction was positive, the Vosges-Proskauer negative and the ratio of hydrogen to carbon dioxide in fermentation was two to one. It fermented dextrose, dulcite, mannite, maltose, raffinose, adonite and inulin with the production of acid and gas. It did not ferment saccharose at all. The percentage of gas formed in dextrose was 54%. Turbidity was present in broth and in peptone cultures. The organism was pathogenic and pyogenic to mice and to guinea-pigs. Agglutination tests were carried out with the blood serum of one of the inoculated guinea-pigs, with that of the patient and with the serum of the author. The organism reacted in four times the dilution with the serum of the patient as compared with that of the author. The author is unable to assert that the organism was the exciting cause of the cystitis, as it might be a secondary invader, though he considers this supposition improbable. The organism is not a typical *Bacillus coli communis*, from which it differs in motility and in the power of fermenting adonite and inulin. Its exact identity could not be determined.

(210) Distribution of Influenza Bacilli.

I. W. Pritchett and E. G. Stillman have studied the distribution of *Bacillus influenzæ* in the throats and saliva of different persons (*Journ. Exper. Medicine*, March, 1919). By using Avery's oleate hæmoglobin the separation of *Bacillus influenzæ* from other organisms was much facilitated. The isolated microbes were identified by further examination. Four types of organism produce colonies closely resembling those of *Bacillus influenzæ*. These are *Micrococcus catarrhalis*, the meningococcus, diphtheroids and an unknown bacillus tentatively called *Bacillus x*. In respect to the occurrence in those suffering from influenza, the *Bacillus influenzæ* was isolated from 41 out of 49 patients suffering from uncomplicated influenza, or 83%, in 40 out of 45 patients with influenza and broncho-pneumonia, or 93%, and in 11 out of 22 persons with lobar pneumonia. The pneumococci associated with Pfeiffer's bacilli in the cases of broncho-pneumonia belonging to types III. and IV. and not to types I. and II., which have been usually found associated with pneumonia in the Rockefeller Hospital. Among 54 convalescent patients the *Bacillus influenzæ* was separated on 25 occasions, or in 46%, while among 177 healthy persons in the Rockefeller Institute, its hospital and in the War Demonstration Hospital the *Bacillus influenzæ* was isolated in 74, or in 42%. The bacilli were isolated more often from swabs of the throat than from the saliva. It thus appears that there are many "carriers" of *Bacilus influenzæ* during an epidemic of influenza.

(211) Epidemiology of Amœbic Dysentery.

H. M. Woodcock is of opinion that the conclusion that house-flies are a very potent factor in the spread of amœbic dysentery drawn from the work of Wenyon and O'Connor is not well founded (*Journ. Roy. Army Med. Corps*, March, 1919). During two years' work in various parts of Egypt the author has had many opportunities of investigating the incidence of amœbic dysentery. He considers that far too much stress is laid upon flies in connexion with the transmission of the disease. In the Southern Canal area, flies were abundant, yet only 2% of the stools examined showed the presence of *Entamœba histolytica*. Among the Indian troops the proportion of infected stools was 12½%, yet there was no increase in the proportion of infected stools. Such dysentery as occurred was found among those already carriers of the infection. The author lays stress on the necessity for moisture and a humid climate for the transmission of amœbic dysentery freely through the population. He instances the rarity of the infection of the stools among prisoners from the Hedjaz. He records parallel curves of the percentage of infection among the stools examined and the relative humidity of air covering the months from March to October. He notes that the curves of the number of acute cases of amœbic dysentery lies also parallel to the curve of percentage humidity.

PÆDIATRIES.

(212) Antiscorbutic Values of Foods.

Since the war began, the study of scurvy has received an additional impetus, owing to the occurrence of this disease not only among the troops, but also among the civilian population. Hess and Unger (*American Journ. of Dis. of Children*, April, 1919) give the following summary of their investigations into the antiscorbutic values of foods, basing their remarks on the results of experiments with scorbutic infants. Milk, vegetables, fruits and drugs were all employed. Numerous reports show that during the war there was considerable scurvy among the troops of the various armies, least of all on the Eastern front. The scurvy was mainly of the latent, sub-acute variety and influenced the character of some of the infectious disease. Scurvy also prevailed among the civilian population to a degree far greater than in peace times. In infants the question of scurvy centres about the milk supply. An infant requires fully half a litre of fresh raw milk daily to protect it from this disorder. If the milk is pasteurized, or stale, or heated for a second time, or rendered more sensitive to deterioration by means of an alkali, and particularly if more than one of these influences are operative, more than this quantity is needed. The fact that there is an inverse relationship between the amount of milk consumed and the tendency to scurvy shows that the disorder does not depend on an exogenous toxin, and argues in favour of it being primarily a deficiency disease. Milk does not necessarily lose its antiscorbutic properties in the course of drying. If it is dried rapidly, even at a temperature of 115° C., it retains sufficient of the protective factor to have curative value, provided that it was fresh at the time of drying. In considering the question of the destruction of this vitamine by heat or by alkali, the duration of exposure to the detrimental influence is of the greatest importance. Babies fed on pasteurized milk should receive an antiscorbutic from the time they are a few weeks of age, as there is no reason for allowing the negative balance of vitamine to continue for a longer period. A small amount of orange juice will answer the purpose and is potent for a period after alkalinization. Its value does not reside in its laxative properties, nor in its salt content, as artificial orange juice has practically no therapeutic effect. If orange juice is filtered, boiled and rendered faintly alkaline, it may be given intravenously without causing any untoward reaction. In this way a very prompt cure can be accomplished. From a pathogenetic point of view a result obtained by this route is of interest as demonstrating that scurvy can be counteracted by a therapy acting quite apart from the alimentary tract. Diuresis and catharsis do not play an important rôle in the cure of scurvy, as they may be stimulated to a high degree without alleviating the symptoms. This fact argues against the assumption that this disorder is essentially toxic in character. It was found also that giving an antiseptic (sodium benzoate) was without effect. Dehydrated vegetables were ineffective in two instances, in which an equivalent amount of fresh vegetables brought about a cure. It is not to be inferred from this result that dehydration destroys the vitamine. In this connexion too much attention has been paid to the degree of the heating process and too little to the more important factors —the age of the vegetables, their freshness previous to dehydration, the manner of preservation, etc.. For almost a year strained canned tomatoes have been given in place of orange juice to a large number of infants. This has been found to be a very effective antiscorbutic, and is well borne by babies a few weeks of age. It has the advantage of low cost and availability and therefore is of particular value for the children of the poor. Bananas appeared to have little antiscorbutic value and prunes to have none at all in the dose given.

(213) Lice.

After a full description of the various forms of lice which are parasitic to man, their anatomy, habits and life history, A. Bacot (*School Hygiene*, March, 1919) proceeds to discuss their effect upon the human host and the best methods of prevention and destruction. The direct effect of the bite depends to a great extent on the individual and to a less extent on the variety of louse in question. Body lice cause more irritation and reaction than head lice and crab lice cause least. The irritation frequently is not marked until two to three days after the bite and is aggravated by exposure to air. The persistent skin eruptions which follow louse bites are due to scratching and subsequent infection. Both head and clothes lice are responsible for the transmission of typhus, relapsing fever and trench fever. Pediculosis depends for its continuance on a low standard of life. As regards body lice, regular changes of clean clothing and especially the use of specific night garments are direct deterrents to infestation. With the head louse direct attention to the toilet of the head and hair is sufficient. For clothes lice the best method of removal is the application of dry heat. The use of hot water (60° C.) for 30 minutes will destroy both lice and nits; or garments may be thoroughly soaked in crude carbolic acid and water for 20 minutes and dried without rinsing. For lice affecting the hairy parts, the simplest and quickest method is to shave the area affected, with immediate removal of both lice and nits. Oily or greasy substances are the best for application where shaving is objected to. They should be applied freely, especially on the body. For eyebrows and eyelashes applications should be made every few days and for the head every day or two, care being taken to rub the remedy well through the hair and into the scalp and to cover the head afterwards with a rubber cap or waxed paper. The most satisfactory remedies are: (1) sassafras oil, neat or diluted up to 20 times with paraffin oil; (2) oil of turpentine, pure or diluted with paraffin oil; (3) wood-tar oil, pure or diluted; (4) kerosene and olive oil, equal parts, or with sassafras or tar oil added. Less satisfactory are watery solutions of emulsified oils. Phenol (2½%) may be used, lysol 5%, cresol 3%, tar oil emulsion 5% with soft soap or sassafras oil emulsion 10% with soft soap. Nits may be removed with a fine comb. Health officers and nurses should wear overalls and high rubber boots. Powdered naphthalene acts well as a repellent and may be used also on the patient's bed where change of bedding or removal is impossible. Cresote, tar oil and sassafras oil also act as repellents. Most of the proprietary remedies are absolutely useless.

(214) Bovine Tuberculosis in Children.

The results of most investigations into the occurrence of the bovine type of the tubercle bacillus in tuberculosis of children tend to demonstrate the importance of this organism in cases appearing in the early years of life. Austin (*Amer. Journ. of Dis. of Children*, April, 1919) gives an analysis of 24 cases of tuberculosis in children ranging from 2½ months to 11 years. Seven of the 24 cases showed infection with the bovine type of the bacillus. The series did not allow of any deductions as to the relative virulence of the two types of organisms. All but three of the cases were fatal; one non-fatal case of the human type and two of the bovine type were instances of bone or joint tuberculosis, apparently localized. Nor did it give information regarding the higher or lower percentage incidence of bovine infection at different age periods. Only one of nine patients under two years showed a bovine infection and all seven of the bovine type patients were under 6 years. Concerning a previously published statement that the bovine type of organism causes a large percentage of the rarer alimentary tuberculosis, requiring operation or causing death, the present series showed a bovine type of the bacillus in the few cases in which an alimentary origin of the disease was probable. In 12 cases in which the primary focus was noted, it was found in six in the right lung, in two in the left lung, in three cases apparently in a bronchial lymphatic gland on the right side and in one case in the intestine. One of the bronchial glandular cases and the intestinal case were bovine infections. The corneal scratch test was not very satisfactory. Although consistently negative in rabbits with human type infections, it was not invariably positive in the bovine type animals. As it is generally considered that bovine infection most likely occurs through cow's milk, it was of interest to note that all the patients of the series consumed commercial pasteurized milk. The author regards this as pointing to the necessity of home pasteurization of cow's milk.

Naval and Military.

HONOURS.

In the *Commonwealth of Australia Gazette*, No. 67, of June 3, 1919, a number of entries in the *London Gazette* concerning the military awards for distinguished service are reproduced. We have already published the reference to Major Donald Dunbar Coutts, D.S.O., and to Captain Kenneth Arthur McLean, M.C. and Bar (April 5, 1917), to Captain Cedric Murray Sampson, M.C. and Bar, to Captain Frederick Hobart James, M.C., to Captain Archibald Lang McLean, M.C., and to Captain Reginald Edward Noland, M.C. (May 17, 1917).

Distinguished Service Order.

Captain Patrick Joseph Francis O'Shea, M.C., Army Medical Corps, attached to 8th Battalion. For conspicuous gallantry and devotion to duty near Chuignes on 23rd August, 1918. Keeping up with the advance, he was always in the hottest part of the line, dressing wounded and organizing stretcher-bearers. Realizing that an R.A.P. could not cope with the casualties, he dressed them where they lay and made prisoners carry them back. In many cases he carried men back himself under heavy fire of all descriptions, and working in gas-drenched areas. He had no rest for three days and nights, and did another medical officer's work as well as his own.

Military Cross.

Captain Christopher Norman Matheson, 7th Field Ambulance, attached to 27th Battalion. In the attack east of Mont St. Quentin, on the 2nd September, 1918, he pushed forward behind the first waves, attending the wounded under heavy artillery and machine-gun fire. Later, he established a forward post, and through his gallantry and his untiring exertion he saved many lives by getting their wounds expeditiously dressed and evacuating them quickly.

Captain Alexander Paterson Murphy, 1st Field Ambulance, attached 12th Battalion. For conspicuous gallantry and devotion to duty near Peronne, from 23rd to 26th August, 1918, as R.M.O. of a battalion. He placed his aid post in a railway cutting, where he dressed the wounded of his own and other units, under machine-gun and shell fire. When all our wounded had been cleared, he went out and attended to the enemy in the open; while doing so, a shell burst in their midst, killing his orderly, a stretcher-bearer and several wounded, and wounding him. He continued at work for another 24 hours before reporting for relief.

Captain (now Major) William James Ellery Phillips, 11th Field Ambulance, Army Medical Corps. For conspicuous gallantry and devotion to duty on 6th and 7th September, 1918, during an advance on Roisel. He worked continuously for 48 hours in charge of the evacuation of the wounded from the forward aid posts. Although the area was heavily shelled, he got his ambulance cars right up and cleared the wounded with great rapidity. His energy and perseverance set a splendid example to those working with him.

In the same issue of the *Commonwealth of Australia Gazette* there is the announcement that Major Lionel Oxborrow Betts, Australian Army Medical Corps, has geen created an Officer of the Most Excellent Order of the British Empire for services in connexion with the war.

APPOINTMENTS.

The following appointments, etc., have been published in the *Commonwealth of Australia Gazette*, No. 69, of June 5, 1919:—

Permanent Naval Forces of the Commonwealth (Sea-Going Forces).

Appointment.

To be Surgeon-Lieutenant (on Probation)—

Richard Irving Duggle, L.R.C.P., L.R.C.S., L.R.F.P.S., Permanent Service. Dated 1st May, 1919.

Transfer to the Permanent List.

Surgeon-Lieutenant Thomas Arthur Kidson, M.B., Ch.M., appointed for temporary service, is transferred to the Permanent List, with his present rank, and with seniority of 8th July, 1918; to date 25th April, 1918.

Termination of Appointments.

The temporary appointments of the following officers are terminated at their own request:—

Surgeon-Lieutenant Austen L'Estrange Mahon, M.B., Ch.B.. Dated 26th April, 1919.

Surgeon-Lieutenant Thomas Liddon Parr, M.B., Ch.M.. Dated 10th April, 1919.

It is announced from Melbourne that Major T. F. Brown, D.S.O., has been appointed a member of the Military Commission of Inquiry, in the place of Colonel A. H. Thwaites.

In view of the victory celebrations to be held on the declaration of peace, a march through the city of Sydney of returned soldiers has been arranged. It is expected that a considerable number of members of the Australian Army Medical Corps units will take part. Colonel R. E. Roth, C.M.G., D.S.O., has been appointed to take command of these units on the occasion and has arranged with Colonel T. M. Martin, C.M.G., to assist him or to take charge in case of his absence. All officers who have served abroad with any of these units, are invited to attend and any who are willing to assist in the direction of the march, are asked to forward their names to Colonel Roth or Colonel Martin, Imperial Service Club, Penzance Chambers, 29 Elizabeth Street, Sydney.

Dr. Robert Thomson Paton, Director-General of Public Health of New South Wales, has been appointed Commissioner under the *Venereal Diseases Act, 1918*. It will be remembered that Dr. Paton was appointed temporary Commissioner in January of this year (see *The Medical Journal of Australia*, January 18, 1919, p. 55). It will further be remembered that, during the debate in the Legislative Assembly, Dr. Richard Arthur persuaded the Assembly to delete the following words from Section 23: "The Director-General of Public Health or, if there is no person holding that office." The clause now reads: "A medical practitioner appointed by the Governor shall be the Commissioner under this Act." The reason put forward by Dr. Arthur and accepted by the House was that the duties and responsibilities attaching to this post were so great that it would be impossible for any man to administer the Act satisfactorily, unless he could devote the whole of his time to the work.

Frederic Cyprian Herlihy, Esq., M.B., Ch.M., 1918 (Univ. Sydney); of 99 Norton Street, Leichhardt, has been nominated for election as a member of the New South Wales Branch of the British Medical Association.

The undermentioned have been elected members of the Victorian Branch of the British Medical Association:—

Edward Thomas Philip Eames, M.R.C.S., Eng., L.R.C.P., Lond. (1892), Navy Office, Melbourne.

Ellen Curtis Edgerton, M.B., Ch.B. (1919. Univ. Melb.), Elsternwick, Victoria.

Charles Donald Russell, M.B., Ch.B. (1887, Univ. Melb.), 163 Victoria Street, North Melbourne.

J. E. O'Flynn, Esq., M.B., Ch.B. (1913, Nat. Univ., Ireland), of Normanton, Queensland, has been elected a member of the Queensland Branch of the British Medical Association.

H. R. Pomroy, Esq., M.B., B.S. (1918, Univ. Adelaide), of the Quarantine Department, Fremantle, has been elected a member of the Western Australian Branch of the British Medical Association.

We regret to announce the death of Dr. John Flynn, Medical Officer of Health at Ipswich, Queensland.

Obituary.

JOHN BASIL ST. VINCENT WELCH.

After having served for three and a half years with the Australian Imperial Force, during which time he was wounded twice and invalided on account of illness once, John Basil St. Vincent Welch has "gone West," after the onslaught of an invisible foe. He contracted influenza in the course of his practice, while attending many patients who were suffering from this disease, and died at the Royal North Shore Hospital, Sydney, on May 20, 1919.

John Basil St. Vincent Welch, the second son of the late Mr. J. St. Vincent Welch, for many years the General Manager of the Commercial Union Assurance Company in Sydney, was born at Burwood on October 10, 1881. He was educated at the North Sydney Church of England Grammar School, where he applied himself with diligence to his various tasks and acquitted himself with credit, more especially in classics. Leaving school in 1899, he matriculated at the University of Sydney, spent one year studying Arts and then passed into the Medical School. He was a successful student and was very popular among his comrades. In 1906 he took his degrees in medicine and surgery. Immediately after graduating he was appointed Medical Superintendent of the Royal Alexandra Hospital for Children and in the same year he enlisted in the Army Medical Corps of the Australian Military Forces. In 1908 he received his commission as Captain. After leaving the Children's Hospital, he travelled to the East. On his return he settled in practice in North Sydney, where he established himself rapidly and earned the reputation of an absolutely reliable practitioner, a skilful surgeon and a kind friend. At a later date he was appointed Honorary Radiologist at the Royal North Shore Hospital and eventually one of the honorary surgeons of the visiting staff.

On the outbreak of war in August, 1914, he claimed his right with several other members of the Military Forces to be included in the First Expeditionary Force. He was attached to the First Field Ambulance under Colonel Beeston and proceeded to Egypt. His unit was stationed at Mena until the memorable 25th of April. John Basil St. Vincent Welch was present at the landing at Gallipoli. The qualities of the man which later proved to be invaluable to his country, became evident at the landing, when with the utmost *sang froid* he stood up to his shoulders in the water taking photographs of the stirring scenes of that day. Unfortunately, these records were accidentally destroyed later on. He had been promoted to the rank of Major while in Egypt, in recognition of his valuable services as a manager and organizer. On the Peninsula he was given responsible and important duties to perform and he seized every opportunity of giving a good account of himself. During the three or four months after the landing he worked as hard as anyone in the Forces. He was in frequent association with his brother, Captain (now Lieutenant-Colonel) Herbert L. St. Vincent Welch and, from time to time, met his brother, Captain Leslie St. Vincent Welch. On one occasion he was wounded in the hand by a bullet, but did not go off duty. Later he was attacked with epidemic jaundice and, as he was being removed from the lines, he was again wounded. His illness proved a severe one, and after recovery he was compelled to spend a short time of furlough in Sicily. He returned to Gallipoli and performed more sterling work. While on the Peninsula he was promoted temporarily to the rank of Lieutenant-Colonel. In February, 1916, this rank was confirmed. His unit left Gallipoli shortly before the evacuation. Some months were spent on the Canal before orders were received to proceed to France. In France he was transferred to the 13th Field Ambulance and was placed in command. He distinguished himself in his new sphere of activity and, by utilizing his unusually fine organing ability, his unit was singled out as one of the most active and valuable in the Australian forces. It was especially during the second advance on the River Somme that his fine work in evacuating the wounded attracted attention. His fearlessness and absolute disregard for his own comfort or safety were rewarded by a Distinguished Service Order. Much of his hardest work was performed under conditions which would have caused an ordinary man to have spared himself. His illness on the Peninsula had left traces which were quite noticeable. During the early part of 1918 he returned from Europe, and, as soon as he was demobilized, he again took up his practice in North Sydney. The joy which his patients experienced on his return, however, was but short-lived, and a very large number of them mourn because they have lost a medical adviser whom they will find difficult to replace.

John Basil St. Vincent Welch was a delightful companion, a true gentleman and a thorough friend. His popularity did not depend on any brilliant record in the field of sport, but on the sterling qualities of his character. He was highly artistic, an expert modeller in wax and a first-class photographer. He delighted the members of the New South Wales Branch of the British Medical Association at a meeting not long ago with a demonstration of a most instructive and interesting series of lantern photographs taken by him during his period of active service. Widespread sympathy is felt for his young widow. His two gallant brothers and the other members of his family have received very numerous expressions of sorrow and condolence from his colleagues and friends.

HEINRICH RABL.

Heinrich Rabl was born at München, in the Kingdom of Bavaria, in the year 1857, and graduated in medicine and surgery at the University of Munich in 1881. He was the son of a landed proprietor, whose family for generations past have been engaged in farming pursuits in Bavaria. For a period of two years he acted as surgeon to the military hospital at Munich, engaging in private practice at the same time. He then went to Sumatra, where he was retained as medical adviser to the workers in a large tobacco plantation, but owing to the deleterious effects of the climatic conditions upon his health, he resigned this appointment and came to Victoria in June, 1884. In October of the same year, Heinrich Rabl commenced practice at Murtoa, Victoria, and remained in active practice in this town, with the exception of a trip to his native land twelve years ago, until the onset of his fatal illness, 35 years later. In the year 1885, Heinrich Rabl married Helene, daughter of Mr. Frederick Degenhardt, one of the earliest pioneers of the Murtoa district. One daughter and four sons, one of whom has not yet returned from active service, survive him. His wife's decease and that of his daughter-in-law preceded Heinrich Rabl's death by a few hours only, the household being overtaken by a calamitous and tragic visitation of epidemic influenza.

As a member of the Victorian Branch of the British Medical Association Heinrich Rabl attended the Intercolonial Medical Congresses at Adelaide, Melbourne, Sydney and Dunedin.

He was well known as a man of refined musical taste, and was a finished exponent of both violin and piano music. His special delight was in chamber music, of which he collected an extensive library.

In the town in which he practised for so many years, Heinrich Rabl has left an enduring memorial in the large number of trees which were planted in avenues and reserves, solely on his initiative, the seedlings often being supplied from his own nursery.

He was a lover of trees, and extremely well informed upon all subjects relating to tree life.

By the death of Heinrich Rabl, there has been removed from the medical profession a man of cultivated tastes and kindly disposition, one who never spared himself in the conscientious and capable discharge of his work.

PNEUMONIC INFLUENZA.

Six further proclamations dealing with pneumonic influenza have been published in the *New South Wales Government Gazette* between May 31 and June 5, 1919.

In the first of these an order is given to all persons within the Municipality of Wagga Wagga, the City of Grafton, the Municipality of South Grafton and the village of Ramornie to submit to certain restrictions from June 2, 1919. These restrictions are substantially the same as those previously imposed on persons in the City of Sydney. The second proclamation has the effect of cancelling a previously issued proclamation, according to which the municipal area of Forbes was declared to be an infected area. The third proclamation cancels the orders issued in respect of the municipal area of Coraki and the town of South Woodburn. The usual restrictions are provided for persons in the municipal area of Gundagai from June 4, 1919, by the fourth proclamation, while the fifth and sixth cancel the proclamations previously issued in regard to the municipal area of Lismore and the towns of Pelaw Main, Weston and Kurri Kurri.

Further regulations under the *Health Acts, 1900 to 1917* (Queensland), dealing with influenza, have been published in the *Queensland Government Gazette*, No. 200, of May 29, 1919:—

1. No conductor, guard, or station master, or person in charge of any tramcar, train, or other public vehicle shall carry more passengers on such tramcar, train, or other public vehicle than can be comfortably seated without crushing.

2. No conductor, guard, or station master, or person in charge of any tramcar, train, or other public vehicle shall permit any person to sit upon the lap of any person seated, or to stand, in such tramcar, train, or other public vehicle.

3. Any person ordered by any member of the Police Force, the conductor, guard, or any station master, or person in charge of any tramcar, train, or other public vehicle to leave such tramcar, train, or other public vehicle, who refuses to do so, shall be guilty of an offence and liable to a penalty not exceeding twenty pounds.

4. Any person found standing on, or sitting on the lap of any person seated on, any tramcar, train, or other public vehicle shall be guilty of an offence, and liable to a penalty not exceeding twenty pounds.

In the *Queensland Government Gazette* of May 31, 1919, the Commissioner of Public Health publishes an order prohibiting indoor meetings with certain reservations in the same terms as the order published on May 22, 1919. The order is now extended to 72 areas.

On June 4, 1919, further regulations dealing with influenza were issued in accordance with the provisions of the *Health Acts, 1900 to 1917* (Queensland). The first six deal with infected ports and vessels arriving at infected ports. No vessel from an infected port is allowed to berth within 100 yards of the wharf in any port in Queensland until the vessel and the persons on board have been inspected by a health officer and the health officer has given a certificate to the effect that there will be no reasonable risk of infection by any person disembarking from the vessel. The health officer is permitted to ask any question he deems relevant to his enquiry of any person on board the vessel. The penalty for a breach of the regulations or for obstructing any authorized person, is a fine not exceeding £100 or imprisonment not exceeding six months. The Commissioner may order the isolation of any place, premises, wharf, vessel, building or area in which there are or have been persons who, in the opinion of the Commission or of the Health Officer, are suffering from influenza or are suspected to be so suffering or are likely so to suffer or who have come from an infected place. The Commissioner may further make orders to prevent any person from entering or leaving such an isolated place.

In the second set of regulations it is prescribed that no person shall enter the city of Mackay by land, unless he produces a declaration to the effect that he has not knowingly during the previous two days been in contact with any person infected with influenza and a certificate from a health officer that he does not show any signs of being infected with influenza.

Special Correspondence.

(By Our Special Correspondent.)

LONDON LETTER.

Oxford University and the War.

Convocation at Oxford on October 9, 1918, was largely attended. A communication was read from the Chancellor, nominating Dr. A. E. D. Blakiston, President of Trinity College, Vice-Chancellor for the ensuing year, his second of office.

In addressing the Convocation, the Vice-Chancellor referred to the fact that the whole thought of the University was taken up with the war, and to the eminent position occupied by Oxford men, such as Sir Douglas Haig and Viscount Milner. He especially mentioned the lead given to the country at and since the beginning of the war by members of the University. The total number of Oxford men engaged on active service was estimated at 12,000; the losses by death were over 2,300, and distinctions gained in the war were upwards to 2,000. The Vice-Chancellor alluded to the necessity of taking timely steps for the benefit of the officers who will resume or commence their studies after the war, and to the fact that when the age was altered last summer there were only twenty-five men among the tutors and professors who were under fifty, remaining in residence.

Dr. Blakiston congratulated the University on the appointment of Dr. Headlam to the Regius Professorship of Divinity, and Dr. H. P. Allen to the Professorship of Music, in succession to Sir Walter Parratt. He referred to the festival occasions that had been possible in spite of the war, includ-

ing the visit of the Princess Mary, the delegation of the Italian professors, and the conferment of the degree of D.C.L. on the King of the Belgians, who had promised to visit Oxford after the war.

Amidst the clamour of arms, the Vice-Chancellor added, there had been little legislation, but certain beneficial measures had been passed, one unconnected with the war, the establishment of a committee for the fine arts, others useful to students affected by the war, such as the new diploma in theology, the new School of Agricultural Forestry, and a measure likely to be popular after the war for promoting intercourse with foreign Universities. Other legislation had been considered and statutes prepared in various subjects, which must be left for the re-constitution of the University.

The Pro-Vice-Chancellors were re-appointed: the Dean of Christ Church, the Rector of Exeter, the Warden of Wadham and the Warden of All Souls.

The Control of Venereal Disease.

The second annual report of the National Council for Combating Venereal Diseases shows that the work has been greatly extended during the past year. A strong branch has been formed in South Africa, and communications have been opened with Canada, Australia and New Zealand, with the object of forming similar organizations in those Dominions. Since May, 1916, branches of the Council have been established in fourteen towns in this country. It is regretted that a certain number of counties and county boroughs have not taken any steps towards providing educational facilities, but the Council hope that this will be remedied during the coming year. Since the previous report, in June, 1916, lectures to the number of 639 have been given to the Army officers and men under the auspices of the Council, and also a considerable number to Officer Cadet Battalions, by special request of the Director-General of the Army Medical Service. The Council have undertaken a large number of lectures to the Special Training Reserve Battalions for boys under nineteen years of age. Unfortunately, the lectures have been considerably hampered by the limited number of men available for this important work, and the future outlook is unsatisfactory, owing to a recent further limitation of the supply of lecturers, as a result of the demands of the R.A.M.C. for the services of some of their number. The approximate number of men addressed was 403,200, bringing the total up to 1,279,062 since the formation of the Council. Appeals issued to the public for money during 1916 had most satisfactory results, the donations amounting to nearly £15,000. Expenditure is now being incurred at the rate of about £600 a month.

Correspondence.

MERCURY IN THE TREATMENT OF INFLUENZA.

Sir,—Like other medical men, one has tried all the "cures" suggested for 'flu; indeed, at times, one has snatched at every remedy spoken of. "Cures" can only be proved by extensive trial and with that object in view I am writing this letter. Reading in an Italian journal, before the pandemic arrived here, of the brilliant results claimed from the use of *hydrargyrum* one was persuaded to give it a thorough test. Unfortunately, neither the dose, method nor preparation used were stated. At first *liq. hydrarg. perchlor.* by mouth was tried, then *hydrarg. perchlor.* hypodermically, finally collosol *hydrargrum,* intravenously, as used by Dr. Boelke. After experience of over two hundred pneumonic cases I am persuaded of the value of mercury in the treatment of 'flu. It may not be a panacea for the toxic fulminating type, but in my experience at any rate it will save many patients who would otherwise be lost. If collosol *hydrargyrum* is used, it appears best to give injections before noon each day till an improvement or crisis takes place. If the patient is very bad two injections may be given on the first day, followed by one daily for five or ten days. Most malignant types improve under this treatment. However, it is for others to test it.

Yours, etc.,

M. S. VEECH, M.B.

June 6, 1919.

SECRETIN IN DIABETES MELLITUS.

Sir,—In Dr. Jona's article on diabetes which appeared in the *Journal* of May 24 there are two points which I should like to call attention to.

Firstly, I should like to plead for blood sugar estimations as giving more reliable data as to the actual improvement or otherwise in cases of diabetes and therefore as to the real value of any given treatment. To go simply on the symptoms of polyuria, polydipsia and glycosuria will lead to a higher percentage of error than if the fluctuation in the hyperglycæmia be taken as the main criterion of improvement or otherwise under treatment.

Secondly, the question arises in my mind as to whether the administration of secretin, if, as it appears, it stimulates the islets of Langerhans as well as the glandular tissue, may not by throwing extra strain on these already diseased and diminished cells, actually do harm. Even though it does lessen the glycosuria, is it not possible that it is actually harming the diabetes? May it not be a case of whipping the tired horse or stimulating the overworked heart? It seems to me to be the opposite to the principle of starvation which is aimed at, lessening the work for the islets and thus permitting their recovery.

Yours, etc.,

IVAN E. ASHBY, M.D., B.S.

"Wittunga," Blackwood, South Australia,
June 1, 1919.

WHITE MEN IN THE TROPICS.

Sir,—Dr. Antill Pockley's letter in last week's issue is unanswerable and is perfectly true for those who are not blind; but I notice that he refers to North Australia as "this fine country," "its enormous resources," etc., just as though he were a politician on the stump. Will someone kindly answer a simple question that I have put to scores of politicians, yet have never had answered? Within a few hundred miles of North Australia lie the vast populations of Java, Sumatra, Borneo and the like, among whom dwell some of the most expert small boat sailors in the world. If North Australia is such a marvellous land of riches, why is it that it has remained almost uninhabited during untold ages? Within a near quarter the human race seems to have originated, and probably the art of sailing was discovered; yet that vast land remains, and has always remained, empty. Is it too hazardous a guess that it will never be filled?

Yours, etc.,

C. MacLAURIN.

Macquarie Street, Sydney,
June 4, 1919.

At the moment of going to press, information has been received that the following additional birthday honours have been awarded. Sir Neville Howse, V.C., K.C.B., Director-General Medical Services, Australian Imperial Force, and Colonel H. C. Maudsley, C.M.G., Consulting Physician, Australian Imperial Force, have been created Knight Commanders of St. Michael and St. George. Surgeon-General C. S. Ryan, C.B., V.D., late Consulting Surgeon of the Australian Imperial Force, has been made a Commander of the Order of the British Empire. We offer the three recipients our hearty congratulations.

A QUESTION OF SPELLING.

Dr. William T. Chenhall, of Sydney, has raised the question as to the correct spelling of the word judgement. According to Murray's *New English Dictionary* and to the rules of the Oxford Press, the original spelling, *judgement,* is correct. The first "e" was omitted by a few writers at the beginning of the eighteenth century. The innovation, however, did not meet with the approval of authorities in orthography and few classical writers have adopted it. For a short time the spelling judgment was used in the weekly edition of *The Times,* while in certain legal documents it has also appeared.

Medical Appointments.

Dr. W. W. Winne Chaplin (B.M.A.) has been appointed Officer of Health to the town of Ballaraat East, during the absence on leave of Dr. J. M. Gardiner (B.M.A.).

The appointment of the following Officers of Health is announced: Dr. T. H. Donnelly (B.M.A.) for the Borough of Sebastopol, Dr. R. Wreyford Lawrence (B.M.A.) for the Shire of Beechworth, Dr. J. J. Hanly for East Riding of the Shire of Dunmunkle, Dr. D. Crombie (B.M.A.) for Cohuna District of the Shire of Kerang and Dr. J. G. Hislop (B.M.A.) for the Central and West Ridings of the Shire of Kowree, Victoria.

In pursuance of the provisions of *The Health Acts, 1900 to 1917* (Queensland), Dr. A. W. Dean (B.M.A.) has been appointed Microbiologist, Analyst and Director of the Laboratory of Microbiology and Pathology, Brisbane. The appointment dates from May 30, 1919.

The Board of Public Health of Victoria has approved of the appointment of Dr. A. J. Bothamley (B.M.A.) as Officer of Health for the Shire of Bright.

Dr. W. S. Watson has been appointed Public Vaccinator for the Northern District and Dr. J. I. Rowan (B.M.A.) for the North-Western District of Victoria.

The appointment as Government Medical Officers of Dr. C. C. Humphries (B.M.A.) at Wauchope, of Dr. L. E. S. Larbalestier (B.M.A.) at Coff's Harbour and of Dr. R. Belli (B.M.A.) at Casino, New South Wales, is announced.

During the illness of Dr. F. H. V. Voss (B.M.A.), Dr. C. W. M. Davidson (B.M.A.) has been appointed Government Medical Officer and Health Officer at Rockhampton for the purposes of the *Health Acts, 1900 to 1917* (Queensland).

Dr. G. W. Mason (B.M.A.) has been appointed Government Medical Officer at Millthorpe, New South Wales, Dr. J. T. Paton (B.M.A.) having resigned.

The appointment of Dr. C. R. Quinn (B.M.A.) as Government Medical Officer at Coonamble, New South Wales, is announced.

Medical Appointments.

IMPORTANT NOTICE.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

Branch.	APPOINTMENTS.
VICTORIA. (Hon. Sec., Medical Society Hall, East Melbourne.)	All Friendly Society Lodges, Institutes, Medical Dispensaries and other Contract Practice. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND. (Hon. Sec., B.M.A. Building, Adelaide Street, Brisbane.)	Australian Natives' Association. Brisbane United Friendly Society Institute. Cloncurry Hospital.
TASMANIA. (Hon. Sec., Macquarie Street, Hobart.)	Medical Officers in all State-aided Hospitals in Tasmania.
SOUTH AUSTRALIA. (Hon. Sec., 3 North Terrace, Adelaide.	Contract Practice Appointments at Renmark. Contract Practice Appointments in South Australia.
WESTERN AUSTRALIA. (Hon. Sec. 6 Bank of New South Wales Chambers, St. George's Terrace, Perth.)	All Contract Practice Appointments in Western Australia.
NEW SOUTH WALES. (Hon. Sec., 30-34 Elizabeth Street, Sydney.)	Australian Natives' Association. Balmain United Friendly Societies' Dispensary. Canterbury United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Friendly Society Lodges at Lithgow. Friendly Society Lodges at Parramatta, Auburn and Lidcombe. Leichhardt and Petersham Dispensary. Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. Newcastle Collieries—Killingworth, Seaham Nos. 1 and 2, West Wallsend. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
NEW ZEALAND: WELLINGTON DIVISION. (Hon. Sec., Wellington.)	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

June 17.—Tas. Branch, B.M.A., Council.
June 17.—N.S.W. Branch, B.M.A., Executive and Finance Committee.
June 18.—W. Aust. Branch, B.M.A., Branch and Council.
June 24.—N.S.W. Branch, B.H.A., Medical Politics Committee; Organization and Science Committee.
June 25.—Vic. Branch, B.M.A., Council.
June 26.—S. Aust. Branch, B.M.A., Annual Meeting.
June 27.—N.S.W. Branch, B.M.A.
June 27.—Q. Branch, B.M.A., Council.
July 1.—N.S.W. Branch, B.M.A., Council.
July 1.—Tas. Branch, B.M.A., Branch and Council.
July 2.—Vic. Branch, B.M.A..
July 4.—Q. Branch, B.M.A..
July 8.—N.S.W. Branch, B.M.A., Ethics Committee.

EDITORIAL NOTICES.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to *The Medical Journal of Australia* alone, unless the contrary be stated.

All communications should be addressed to "The Editor," *The Medical Journal of Australia*, B.M.A. Building, 30-34 Elizabeth Street, Sydney.

The Secretary of the Victorian Branch is endeavouring to secure copies of the issues of the *British Medical Journal* of the following dates, to complete a file for one of the members. We shall be grateful to any of our readers who has a spare copy of any of the numbers sought, if he will offer them to the Secretary of the Branch:—

1915: April 3 and 10; July 10, 17, 24, 31; August 7 and 21.
1916: July 8, August 5 and 12, November 18.
1918: Title Page and Index, Volume I. and Volume II..